

TI GAMES FOR KIDS

Turn your TI[®] Into a teacher.
Thirty-two games that teach and
entertain, ready to type in and run.



Robert P. Ingalls

TI GAMES FOR KIDS

Robert P. Ingalls, Ph.D.

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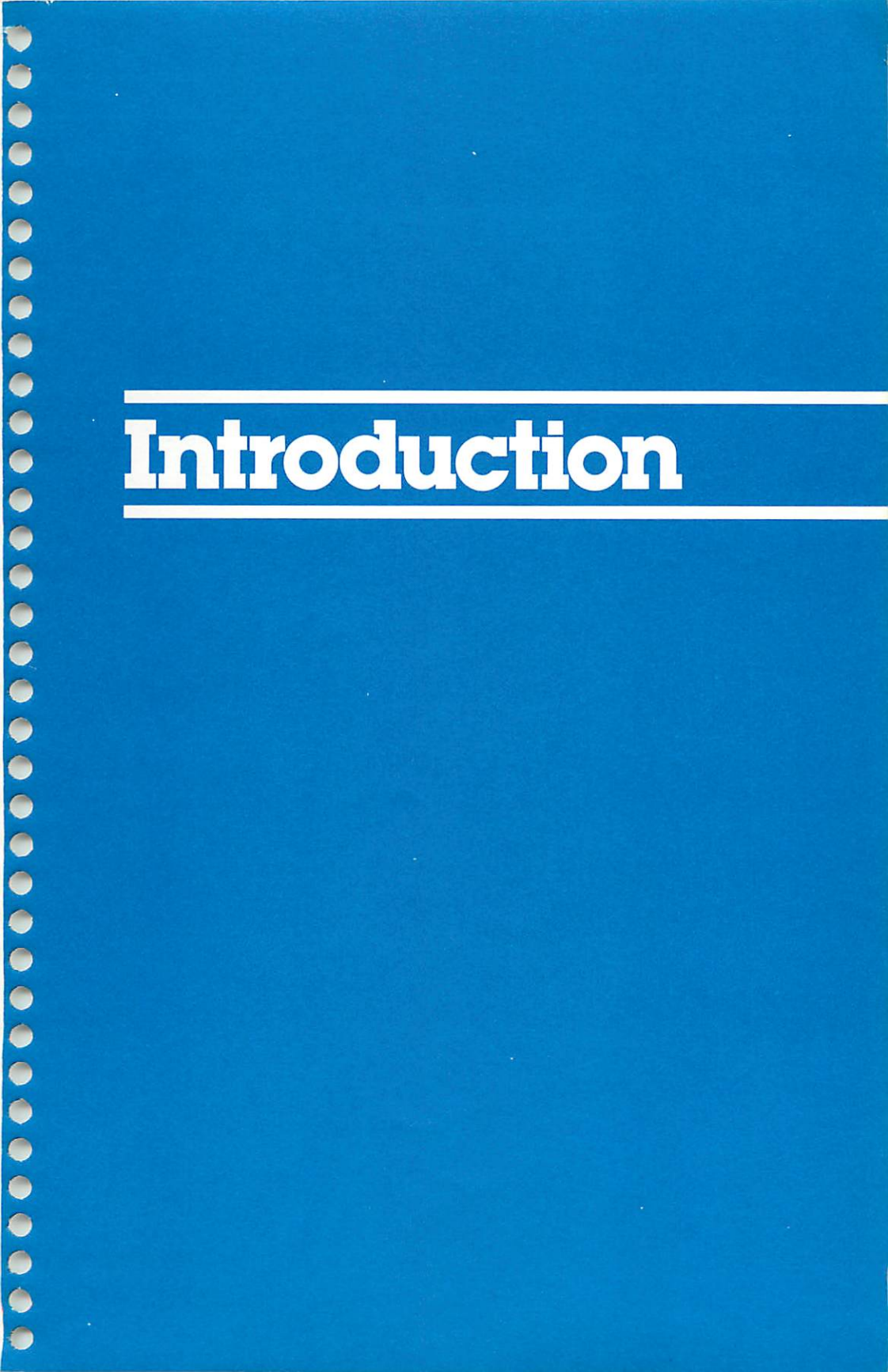
The book is dedicated to my wife Naomi, who in addition to helping to test many of the programs, provided continuing support during the writing of the book.

Foreword

TI Games for Kids contains game programs to entertain and teach children from ages 3 to 17. All games are written in TI BASIC and are ready to type in and run. Included with each game is a clear explanation of how the game is played and what skills the game will teach.

A computer can be an excellent teacher. It can help children learn skills while they are having fun. The 32 games in this book were developed with two goals in mind. First, they should be fun to play and keep the child's interest. Second, the child should learn something from playing them.

If you are a regular reader of *COMPUTE!* Magazine you know the quality of *COMPUTE!*'s programs, and if this is your first *COMPUTE!* publication, you are in for a pleasant surprise. As with all *COMPUTE!* publications, all programs are ready to type in and enjoy.



Introduction

Introduction

There are three major reasons why people buy home computers such as the Texas Instruments 99/4A. The most common reason, according to recent studies, is to play games. The second is to use the computer as an educational tool, as a new medium to help children learn arithmetic, spelling, or other academic skills. The third reason is to learn programming and to become computer literate.

Unfortunately, many people believe learning is something that takes place primarily in schools, with a formal curriculum and formal procedures, and that games and other forms of play and recreation are primarily time fillers and have little educational value. Nothing could be further from the truth. For most children, particularly younger children, most learning takes place outside of formal settings. Children learn most of what they learn by playing. Even for older children and teenagers, playing games and other forms of apparent recreation are a major form of learning and cognitive development.

The theme of this book is that computer games are educational. The 32 games in this book are all developed with two goals in mind. First, they should be fun for the child, and they should keep the child's interest. Second, the child should learn something from playing the game.

Another benefit of the games in this book is that by playing them, children will become comfortable with computers, and this will encourage them to learn more about computers and programming. Clearly a child who is comfortable at a computer keyboard and who has an understanding of what computers can do has an edge over a child who has never worked with a computer. One of the best ways to overcome a fear of computers is to type in and play games such as those in this book.

All of the programs in this book are written for the Texas Instruments 99/4A computer. They are all written in TI BASIC, the language which is built into the console. None requires any peripheral equipment or add-ons such as a disk drive or the Extended BASIC cartridge. The only piece of equipment which is needed other than the computer and a television set is a cassette tape recorder and connectors in order to store programs once you have typed them in.

Several of the programs play better with joysticks than they

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do from the keyboard. For these programs, the changes needed in the program are shown in the text. Usually, this involves changing only a few lines.

The programs in this book are diverse. They are different in several ways. Some programs, such as "Number Concepts" or "Bats and Bugs," are written for preschoolers. They can be used by any child who is able to read numbers on the keyboard or manipulate joysticks. At the other extreme are programs such as "Number Sequences" or "Investments," which are intended primarily for adolescents and even young adults.

The games in this book are arranged by levels. Many of the games are appropriate for children in more than one level. Games are grouped according to the earliest level at which a child would enjoy them.

- Level 1: Ages 3 to 6
- Level 2: Ages 6 to 11
- Level 3: Ages 11 to 17

The programs were also selected to demonstrate the many ways a computer can be used. Even though computers are entering more and more areas of our lives, the potential of the computer is only beginning to be realized. The programs in this book demonstrate a wide range of different types. Some programs make extensive use of the computer's graphic capabilities, such as the four map-drawing programs, which actually draw maps on the screen, or "Fox and Geese," which draws a game board on the screen and moves a fox and several geese around the board. Other programs, such as "Number Sequences" or "Arithmetic Problems," use more traditional computing and numeric capabilities. Still other programs make use of the computer's ability to manipulate words or letters in words (string handling capabilities). Programs such as "Scramble" or "Find the Word" are good examples. Still other programs simulate real life situations, such as the "Blackjack" program or "Car Dealer," and there is even a shoot-em-up game called "Anti-Aircraft."

Because the computer can be used in several different ways, the games in this book have also been divided into various Skill Areas. Each game has a skill area notation, telling you what your child can learn by playing the game. All games in this book teach children something in at least one of seven areas:

- | | | |
|---------------|----------------|--------|
| Coordination | Logic | Memory |
| Language Arts | Mathematics | |
| Strategy | Social Studies | |

Ages for Which Games Are Appropriate

	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Building Blocks															
Number Concepts															
Bats and Bugs															
Introduction to Addition															
Concept Learning															
Maze															
Matching Game															
Anti-Aircraft															
Arithmetic Practice															
Leaping Lizzie															
Maze Race															
Soccer Goalie															
Dicey															
Copy Cat															
Crossout															
Acie Deucie															
Fox and Geese															
Northeastern States															
Midwestern States															
Southern States															
Western States															
Find the Word															
Chase															
Percent Problems															
Remember the Maze															
Scramble															
Depth Charges															
Air Traffic Controller															
Car Dealer															
Blackjack															
Investments															
Number Sequences															

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If your child needs help in, say, mathematics, you may want to look through the book and pick out the games that stress mathematics before going on to other programs.

There are frequently several ways to accomplish the same task on a computer, and different programmers use various techniques. As these programs were being written, one idea was constantly kept in mind: Someone is going to have to spend time typing in every step of the program, so it is important to keep the program short. There was constant tension between the need to keep the programs short and the desire to put "bells and whistles" in them, such as adding a tune or flashing a happy face for correct answers.

With the interests of brevity in mind, most programs in this book do not have extensive instructions in the program itself, since it is silly for someone to spend time typing in instructions when they are in the book. Also, there is little in the way of fancy headings and lead-ins which would require extensive typing but which would add little to the program. For the same reason, there are a minimum of REM statements. (REM stands for remark; a REM statement is a program statement which explains what the program is doing, but which has no effect on how the program actually runs.)

This book should be educational on two levels. On one level, the games should be educational for their own sake. Someone who has little knowledge or interest in programming can type in the programs and play them, just as a person who has no knowledge of electronics can watch a television show. The second level is that kids and adults will learn something about programming and about computers. For anyone with at least a rudimentary understanding of BASIC, typing in the programs will be informative. The various programs make use of virtually every statement in TI BASIC, and they demonstrate a wide variety of different programming techniques. Also, once a program has been typed in, anyone with some understanding of programming will be able to make changes in it. Even more important, the programs in this book should stimulate home computer owners to develop their own software.

Entering Programs

Many TI-99/4A owners have the instructions which came with the computer and an understanding of how to enter and edit programs and how to run them. However, this section is written

as though the reader has never used the computer before and has not read the instructions. It only assumes that the computer is properly connected to a color television set or monitor.

The keyboard of the TI resembles that of a standard typewriter with a few differences. For example, the key marked ENTER at the extreme right functions in some ways like the return key of a typewriter, but in some ways it is different. When this key is struck, it sends the line that has just been typed to the computer's processor and moves the cursor to the extreme left in preparation for typing in a new line (the cursor is the flashing square which indicates where the next character will appear). As a result, it is possible to get an error message when the ENTER key is struck if there are mistakes in the line, such as quotation marks not balancing.

Most of the other differences between the TI keyboard and a typewriter keyboard involve the function key, which is the key marked FCTN in the lower-right corner of the keyboard. This key is similar to the SHIFT key in that it changes the function of the keys if a key is pressed while the FCTN key is depressed. Notice that many keys have a character printed on the front of the key as well as on the top. For example, the I key has a question mark on the front, and the P key has quotation marks on the front. If the FCTN key is depressed while one of these keys is struck, the character on the front of the key rather than the character on the top will appear on the screen.

The four keys with arrows on the front (E, S, D, and X) are exceptions to this rule. The left-pointing arrow (FCTN S) functions as a backspace. It moves the cursor to the left. The right-pointing arrow (FCTN D) moves the cursor to the right. In contrast to the space bar, if the cursor is moved over a character with the FCTN D key, the character is not erased. The down-pointing arrow (FCTN X) is used when you need to edit a line. Let's assume that you wish to edit line 200. Type the line number, in this case 200, and instead of the ENTER key press the FCTN key and the arrow-down key. The line should appear on the screen. Now use the FCTN right arrow to move the cursor to the place on the line you wish to change.

With the exception of the keys in the top row, if the FCTN key is depressed while striking a key which has no character on the front (the B key, for example), a space will be entered. Although the keys in the top row do not have characters printed on the front, they activate special functions if they are struck with the FCTN key depressed. These functions are indicated on the strip over

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the keys (if this strip is not in place, you should find it and slide it into place). For example, the FCTN 3 key will erase the entire line that you have just typed in (notice the word ERASE on the strip above the 3 key). Other functions are described below.

A word of warning: The QUIT function (FCTN +) erases any program in the computer's memory. If you inadvertently call this function while typing in a program, you will erase everything that you have typed in during that session. This can happen when you intend to hit the + character (SHIFT +) but instead of hitting the SHIFT key, you hit the FCTN key.

Now you are ready to type in your first program. Turn on the computer, press any key to display the menu, and then hit the 1 key to get into TI BASIC. All programs should be typed in with the ALPHA LOCK key down (on). First, type in the word NUM and press the ENTER key. NUM is short for number, and this function arranges for the computer to automatically provide line numbers for you. If nothing else is entered after the word NUM, the computer will assign the line number 100 to the first line, and each subsequent line will be increased by 10. All programs in this book follow this numbering format.

After entering the word NUM, the number 100 will be displayed, and you are ready to type in the program. You can either start with one of the full programs in this book, or you can practice with the short sample program listed below.

Type in the first line of the program. Notice that you do not need to type in the line number; the computer has already provided the line number for you. After you have typed in the first line, hit the ENTER key. The next line number will automatically be displayed unless you have made a typographical error which results in an immediate error message. In that case, you would need to retype the same line. It is important to type the program exactly as it appears in the text. Mistakes such as substituting a colon for a semicolon or misspelling a word like HCHAR will cause a program to run incorrectly or not at all.

The exception to this is when you see characters in braces { }. In the program listings in this book, these are used to indicate where more than one space should be left between words in PRINT statements. When you see something like YOUR { 3 SPACES } BANK in a program, you should type the word YOUR, hit the SPACE bar three times, and type BANK. You should *not* type the braces or the words 3 SPACES.

Screen Color Pattern Example

```
100 CALL CLEAR
110 FOR N=1 TO 4
120 CALL CHAR(88+N*8,"007E424242427E00")
130 CALL COLOR(8+N,N*3,1)
140 NEXT N
150 CALL SCREEN(16)
160 DIFF=1
170 COL=1
180 X=INT(RND*4+1)
190 Y=INT(RND*4+1)
200 PRINT TAB(15-COL);CHR$(88+8*X);TAB(14+COL);CHR
   $(88+8*Y)
210 COL=COL+DIFF
220 IF (COL>1)*(COL<10)THEN 180
230 DIFF=-DIFF
240 GOTO 180
```

One mistake which you should be particularly careful to avoid is typing a zero for the letter O or vice versa. Notice that the zero character is displayed slightly differently from the letter O; the latter is more squared.

A single line of a program may occupy more than one line on the screen. Make certain that you have typed the entire program line before pressing the ENTER key, even if the line wraps around to the next line of the screen. You can always tell when a new program line begins because it will start with a line number.

Correcting Mistakes

If you notice that you have made a mistake on the line that you are currently typing in, move the cursor over the incorrect character by holding down the FCTN key and hitting the S key as often as necessary. When the cursor is over the erroneous character, simply type in the correct character. If you have omitted one or more characters, move the cursor over the character immediately to the right of the place where you want to insert the new character(s). Then hit the 2 key while holding down the FCTN key. This activates the INSERT function. Type in the character or characters. You can exit the INSERT mode either by striking the ENTER key or by using the left arrow or the right arrow.

For example, suppose that you are typing in line 130 of the sample program. This line should read:

```
130 CALL COLOR(8+N,N*3,1)
```

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However, you inadvertently omitted the 8+N, so that the line now reads:

```
130 CALL COLOR (N*3,1)
```

and the cursor is now over the space after the closing parenthesis. To correct this, hold down the FCTN key while striking the S key six times. The cursor should now be over the N. While depressing the FCTN key, strike the 2 key to activate the INSERT mode. Now type in 8+N, and the cursor will still be over the N. If you now press the ENTER key, the line will be correctly entered.

To delete a character or characters, move the cursor over the character that you wish to delete, and then hit the 1 key while holding down the FCTN key. This will delete the character and move the cursor to the next character on the right.

If you notice that you have made an error in typing in a line after you have entered the line, you should first get out of the NUM mode by hitting the ENTER key twice. You will know that you are no longer in the NUM mode because the cursor will be at the extreme left of the screen, right next to the prompt (>), and there will be no line number between the prompt and the cursor. Type in the word EDIT, followed by a space, followed by the number of the line that you wish to change. When you hit the ENTER key, the line will appear, and you can use the procedures described above to make whatever changes you wish in the line. When the line is correct, hit the ENTER key.

A second method of changing a line is to type the line number, hold down the FCTN key while pressing the S key, and the line will appear.

To get back into the NUM mode, type in the word NUM followed by a space, followed by the number of the next line that you wish to type in. For example, suppose you typed in lines 100 to 150 of the program, and then noticed a mistake in line 120. Get out of the NUM mode by hitting the ENTER key twice, type in EDIT 120, make the appropriate changes, and ENTER the line. Then type in NUM 160 and hit the ENTER key. The number 160 will appear and you are ready to type in line 160.

When you have finished typing in a program, the next line number will be displayed. Simply hit the ENTER key again to get out of the NUM mode.

Listing a Program

Once a program has been typed in, you can look at the program by typing in the word LIST and then pressing the ENTER key.

The entire program in the computer's memory will be displayed line by line. The program will flash by quickly; so in order to examine a line more closely, you will need to stop the listing. This can be done with the CLEAR function (FCTN 4). If you only wish to display a particular line, type in LIST followed by a space, followed by the line number, and then press ENTER. If you wish to display a number of lines, but not the whole program, type in LIST, followed by a space, the first line number, a hyphen, and the second line number. All of the lines between and including the first and second line numbers will be displayed. The command LIST 150-200, for example, will cause lines 150 through 200 inclusive to be displayed.

The LIST command has no effect on the program itself, and you can use it whenever you wish except when you are in the NUM mode or are running a program.

Debugging

To run a program, type in the word RUN and ENTER it. If you have made no mistakes, the program should run properly. However, if you have made a typographical error in typing in the program, one of two things will happen, depending on the type of error. First, you may get an error message. These will often tell you where the mistake occurred. For example, the message

* INCORRECT STATEMENT
IN 180

means that the mistake was in line 180. You should type in the phrase EDIT 180, and then compare what you have typed in to line 180 in the program listing to see where the mistake is. Make sure that all of the letter O's are O's and not zeros, and that all of the zeros are zeros and not O's. Other error messages, such as FOR-NEXT ERROR, unfortunately do not tell you where the error occurred, so you must hunt through the entire program until you find the mistake.

Sometimes an error will not produce an error message, but will result in the program not running properly. The program might simply stop running or it might do something which is clearly wrong. In these cases you will have to examine the entire program to locate the error unless you understand programming.

One reason why a program is not working properly might be that the ALPHA LOCK key is in the wrong position. For programs that do not use joysticks, the ALPHA LOCK key must be down (on) while the program runs if there are any inputs from the key-

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board. For programs that use joysticks, the ALPHA LOCK key must be up (unlocked) in order for the program to work properly.

Most of the programs in this book will have a natural ending point; but a few, such as the sample program, will run indefinitely until the program is manually ended by the operator. This is done with the CLEAR function (FCTN 4). Anytime a program is running, you can stop it by hitting the 4 key while holding down the FCTN key.

Most of the programs in this book have places where they will stop running and ask for an input from the keyboard. For these there will be a message on the screen indicating what sort of information should be entered. For example, a message NAME OF PLAYER 1 is asking the operator to enter the name of the first player in the game. A message like AGAIN (Y OR N)? is asking if the player wishes to play the game again. In this case, if the Y key is struck, the program will start over again; if the N key is struck, the program will end.

A program will remain in memory indefinitely until it is erased. There are a number of ways to erase a program, and you should be careful not to do any of these things until you have saved the program on tape or disk. There are at least four ways that a program can be erased.

1. By shutting off the computer (this includes pulling the plug out or having the power go off).
2. By using the QUIT function (FCTN +).
3. By entering the word BYE.
4. By entering the word NEW.

It is possible to erase a particular line of a program (either deliberately or by mistake) by typing in the line number and then pressing the ENTER key.

It is possible to shut off the television set, switch channels to watch a show, and even to disconnect the television set from the computer without erasing the current program as long as the computer is not shut off. Later, you can reconnect the television set or switch back to the computer channel and continue your programming. When this is first done, the screen may be blank, but hitting any key will restore whatever was on the screen.

Once you have typed in a program, you might wish to change it. You can change individual lines as outlined above; you can delete lines by typing in the line number and then hitting the ENTER key; and you can insert new lines into your program

simply by assigning appropriate line numbers. For example, suppose you want to insert three new lines between lines 230 and 240 of your program. Simply type in the first new line with the line number 232, the second with the line number 234 and the third with the line number 236, and they will automatically be placed in the appropriate spot in the program. You can verify this with the LIST command.

Level 1 Games

Building Blocks

Skill area: Coordination

Level: 1, 2

Kids love to play with blocks, so it is only appropriate to have a blocks game for the computer. The blocks are arranged in six stacks with different colored blocks in each stack. The blocks can be moved by the crane, which is manipulated with five keys. The S key moves it to the left, the D key moves it to the right, the X key moves it down, and the E key moves it up. The F key causes the crane to drop a block if it is carrying one. *The crane can move left or right only when it is in the top position.*

Using the keys, you maneuver the crane over a stack of blocks and then lower it until it picks up a block. You can then raise the crane to the top position, and move it left or right. When the block is over the position where you want the block to be, pressing the F key causes the block to drop into position. Then you can go back and pick up another block.

You can build any sort of building, house, or tower that you want. The program runs indefinitely and must be ended with the CLEAR function.

Remember that the ALPHA LOCK key must be down in order for the program to work properly.

The program as listed works from the keyboard, but the program can be modified so that the crane is manipulated by joysticks, and the fire button drops the blocks. To alter the program for use with joysticks, make the following changes:

1. Delete lines 130 to 230
2. Substitute the following lines for those in the program:

```
510 CALL JOYST(1,X,Y)
520 IF (X=0)*(Y=4)THEN 580
530 IF (X=4)*(Y=0)THEN 650
540 IF (X=-4)*(Y=0)THEN 750
550 IF (X=0)*(Y=-4)THEN 850
560 CALL KEY(1,K,S)
```

3. Add a new line with the number 565

```
565 IF K=18 THEN 1030
```

Make sure that none of the other line numbers are changed when

Level 1 Games

you delete the lines at the beginning of the program. The joysticks will work properly only if the ALPHA LOCK key is up. As with any program using joysticks, only one of the two units will work, and you will need to experiment to see which of the two works. If for some reason you want the other unit to work instead, change the 1 to a 2 in the parentheses in lines 510 and 560.

Building Blocks

```
100 REM  BUILDING BLOCKS
110 REM
120 CALL CLEAR
130 PRINT TAB(7);"BUILDING BLOCKS":::
140 PRINT "MAKE SURE THAT THE ALPHA{4 SPACES}LOCK
    KEY IS DOWN (ON).":::
150 PRINT "USE S KEY TO GO LEFT"::
160 PRINT "USE E KEY TO GO UP"::
170 PRINT "USE D KEY TO GO RIGHT"::
180 PRINT "USE X KEY TO GO DOWN"::
190 PRINT "USE F KEY TO DROP BLOCK"::
200 PRINT "HIT ANY KEY TO BEGIN."
210 CALL KEY(0,K,S)
220 IF S=0 THEN 210
230 CALL CLEAR
240 A$="FEFEFEFEFEFEFEFE"
250 CALL SCREEN(16)
260 CALL CHAR(40,A$)
270 CALL CHAR(41,"FF402010080402FF")
280 CALL CHAR(42,"1818181818181818")
290 CALL CHAR(43,"181818181818FFFF")
300 CALL CHAR(48,A$)
310 CALL CHAR(56,A$)
320 CALL CHAR(64,A$)
330 CALL CHAR(72,A$)
340 CALL COLOR(2,2,1)
350 CALL COLOR(3,3,1)
360 CALL COLOR(4,8,1)
370 CALL COLOR(5,9,1)
380 CALL COLOR(6,11,1)
390 CALL HCHAR(23,1,40,32)
400 CALL HCHAR(1,3,41,28)
410 CALL HCHAR(2,18,43)
420 CALL VCHAR(9,24,64,14)
430 CALL VCHAR(9,25,72,14)
440 CALL VCHAR(9,26,48,14)
450 CALL VCHAR(9,27,56,14)
460 CALL VCHAR(9,28,64,14)
470 CALL VCHAR(9,29,72,14)
480 R=2
```

Level 1 Games

```
490 C=18
500 CALL HCHAR(24,C,94)
510 CALL KEY(0,K,S)
520 IF K=69 THEN 580
530 IF K=68 THEN 650
540 IF K=83 THEN 750
550 IF K=88 THEN 850
560 IF K=70 THEN 1030
570 GOTO 510
580 IF R=2 THEN 510
590 CALL GCHAR(R+1,C,G)
600 CALL VCHAR(R,C,32,2)
610 R=R-1
620 CALL HCHAR(R,C,43)
630 CALL HCHAR(R+1,C,G)
640 GOTO 510
650 IF C=29 THEN 510
660 IF R>2 THEN 510
670 CALL GCHAR(R+1,C,G)
680 CALL VCHAR(R,C,32,2)
690 CALL HCHAR(24,C,32)
700 C=C+1
710 CALL HCHAR(R,C,43)
720 CALL HCHAR(R+1,C,G)
730 CALL HCHAR(24,C,94)
740 GOTO 510
750 IF C=3 THEN 510
760 IF R>2 THEN 510
770 CALL GCHAR(R+1,C,G)
780 CALL VCHAR(R,C,32,2)
790 CALL HCHAR(24,C,32)
800 C=C-1
810 CALL HCHAR(R,C,43)
820 CALL HCHAR(R+1,C,G)
830 CALL HCHAR(24,C,94)
840 GOTO 510
850 CALL GCHAR(R+1,C,G)
860 IF G=32 THEN 900
870 CALL GCHAR(R+2,C,GG)
880 IF GG=32 THEN 980
890 GOTO 510
900 IF R=21 THEN 510
910 CALL HCHAR(R,C,42)
920 R=R+1
930 CALL HCHAR(R,C,43)
940 CALL GCHAR(R+1,C,G)
950 IF G=32 THEN 510
960 CALL SOUND(100,300,3)
970 GOTO 510
```

Level 1 Games

```
980 CALL HCHAR(R,C,42)
990 R=R+1
1000 CALL HCHAR(R,C,43)
1010 CALL HCHAR(R+1,C,G)
1020 GOTO 510
1030 CALL GCHAR(R+1,C,G)
1040 IF G=32 THEN 510
1050 D=1
1060 CALL SOUND(50,300,3)
1070 CALL GCHAR(R+D+1,C,GG)
1080 IF GG<>32 THEN 1130
1090 CALL HCHAR(R+D,C,32)
1100 D=D+1
1110 CALL HCHAR(R+D,C,G)
1120 GOTO 1070
1130 CALL SOUND(50,-6,3)
1140 GOTO 510
```

Number Concepts

Skill area: Mathematics

Level: 1, 2

The only skills required to play "Number Concepts" are the ability to count and the ability to locate number keys on the keyboard and type them.

A number of objects are displayed on the screen. You must count the objects and enter the number. If you enter the correct number, a little man dances across the screen, and a new problem appears. If you enter the wrong number, the program makes an unpleasant sound, and you are given another try. If, after three tries, you still have not entered the correct number, the answer is flashed across the screen. Then a new problem appears.

Your parents can set the minimum and maximum number of objects. For those who are just beginning to learn numbers, a parent could set a minimum of one and a maximum of three so that all of the problems would have one, two, or three objects. For those who are more advanced, the parent could set the minimum at ten and the maximum at twenty so that all of the problems would have between ten and twenty objects. The maximum number of objects allowed is twenty-five, and there must be a range of at least three.

There are six possible objects, and which object is used on a particular turn is determined randomly.

Number Concepts

```

100 REM  NUMBER CONCEPTS
110 REM
120 CALL  CLEAR
130 RANDOMIZE
140 CALL  CHAR(128,"00000103070F1F3F")
150 CALL  CHAR(129,"00000080C0E0F0F8")
160 CALL  CHAR(130,"7F3F1F0F07030100")
170 CALL  CHAR(131,"FCF8F0E0C0800000")
180 CALL  CHAR(132,"0000000C1E3F3F3F")
190 CALL  CHAR(133,"00000060F0F8F8F8")
200 CALL  CHAR(134,"3F1F0F0703010000")
210 CALL  CHAR(135,"F8F0E0C080000000")
220 CALL  CHAR(136,"0000387C1C0C0C0E")
230 CALL  CHAR(137,"0000000000000006")

```

Level 1 Games

```
240 CALL CHAR(138,"1F1F0F0703010300")
250 CALL CHAR(139,"FEFCF8F0E0406000")
260 CALL CHAR(140,"000002040810207F")
270 CALL CHAR(141,"00000000000000FE")
280 CALL CHAR(142,"2010080402000000")
290 CALL CHAR(143,"0")
300 CALL CHAR(144,"FFFC0C0C0C0C0C0")
310 CALL CHAR(145,"FFFF030303030303")
320 CALL CHAR(146,"C0C0C0C0C0C0FFFF")
330 CALL CHAR(147,"030303030303FFFF")
340 CALL CHAR(148,"01010101010101FF")
350 CALL CHAR(149,"80808080808080FF")
360 CALL CHAR(150,"FF01010101010101")
370 CALL CHAR(151,"FF80808080808080")
380 CALL CHAR(152,"1818FF18182442")
390 PRINT "THIS IS A PROGRAM TO TEACH  NUMBER CONC
      EPTS AND COUNTING"
400 PRINT "TO YOUNG CHILDREN. A NUMBER OF OBJECTS
      WILL BE DISPLAYED"
410 PRINT "ON THE SCREEN, AND THE CHILDMUST KEY IN
      THE CORRECT{5 SPACES}NUMBER. FIRST, YOU HAVE
      TO"
420 PRINT "ENTER THE MINIMUM NUMBER{4 SPACES}OF OB
      JECTS AND THE MAXIMUM"
430 PRINT "NUMBER (UP TO 25).":
450 INPUT "MINIMUM  ":MIN
460 PRINT
470 IF (MIN<1)+(MIN>21)THEN 870
480 INPUT "MAXIMUM  ":MAX
490 IF (MAX<3)+(MAX>25)THEN 890
500 IF (MAX-MIN)<2 THEN 890
510 DIFF=MAX-MIN+1
520 CALL CLEAR
530 ERROR=0
540 X=INT(RND*DIFF+MIN)
550 Y=INT(RND*6+1)
560 FOR J=1 TO X
570 C=(INT(RND*6+1))*4+2
580 R=(INT(RND*5+1))*4
590 CALL GCHAR(R,C,G)
600 IF G>32 THEN 570
610 CALL HCHAR(R,C,124+4*Y)
620 CALL HCHAR(R,C+1,125+4*Y)
630 CALL HCHAR(R+1,C,126+4*Y)
640 CALL HCHAR(R+1,C+1,127+4*Y)
650 NEXT J
660 INPUT GUESS
670 IF GUESS=X THEN 720
680 ERROR=ERROR+1
```

Level 1 Games

```
690 CALL SOUND(200,-3,2)
700 IF ERROR<3 THEN 660
710 GOTO 810
720 CALL CLEAR
730 D=150
740 FOR K=6 TO 26
750 CALL HCHAR(12,K,152)
760 CALL SOUND(250,500+D,2)
770 D=-D
780 CALL HCHAR(12,K,32)
790 NEXT K
800 GOTO 520
810 FOR I=1 TO 20
820 PRINT TAB(14);X
830 NEXT I
840 FOR I=1 TO 400
850 NEXT I
860 GOTO 520
870 PRINT : "TRY AGAIN!":
880 GOTO 450
890 PRINT : "TRY AGAIN!":
900 GOTO 480
```

Bats and Bugs

Skill area: Coordination

Level: 1

"Bats and Bugs" is a videogame for preschool children. It can be played by anyone who is old enough either to manipulate joysticks or control a character using the four arrow keys. Because it is for preschoolers, it plays very slowly, and there is no score. You are rewarded with songs such as "Twinkle Twinkle Little Star" or "Oh Susannah." You move a bat around the screen with the four arrow keys, and as the bat moves, it flaps its wings. There are eight bugs on the screen which also move about, and the objective is for the bat to catch a bug. Whenever it does, one of four songs plays. This game teaches you eye/hand coordination and the concepts of left, right, up and down.

The program uses the four arrow keys — S for left, E for up, D for right, and X for down — to control the bat. However, it can be easily modified so that the bat is controlled with joysticks instead. This can be done by substituting the following five lines:

```
350 CALL JOYST(1,X,Y)
380 IF (X=0)*(Y=4)THEN 820
390 IF (X=4)*(Y=0)THEN 850
400 IF (X=0)*(Y=-4)THEN 880
410 IF (X=-4)*(Y=0)THEN 910
```

When using the four keys, the ALPHA LOCK key must be down; when using joysticks, the ALPHA LOCK key must be up.

Bats and Bugs

```
100 REM  BATS AND BUGS
110 REM
120 CALL CLEAR
130 CALL CHAR(132,"0000FFFF03030100")
140 CALL CHAR(133,"0000FFFFC0C08000")
150 CALL CHAR(134,"00081C3763430100")
160 CALL CHAR(135,"001038ECC6C28000")
170 R=12
180 N=1
190 C=14
200 D=1
210 CALL SCREEN(16)
220 E=-1
```

Level 1 Games

```
230 RANDOMIZE
240 DIM A(8),B(8)
250 FOR I=1 TO 8
260 A(I)=INT(RND*20+2)
270 B(I)=INT(RND*24+4)
280 IF (A(I)=12)*(B(I)=14)THEN 260
290 IF (A(I)=12)*(B(I)=15)THEN 260
300 CALL HCHAR(A(I),B(I),42)
310 NEXT I
320 REM LOOP BEGINS
330 T=0
340 E=-E
350 CALL KEY(0,K,S)
360 CALL HCHAR(R,C,32)
370 CALL HCHAR(R,C+1,32)
380 IF K=69 THEN 820
390 IF K=68 THEN 850
400 IF K=88 THEN 880
410 IF K=83 THEN 910
420 CALL GCHAR(R,C,G)
430 CALL GCHAR(R,C+1,GG)
440 CALL HCHAR(R,C,133+E)
450 CALL HCHAR(R,C+1,134+E)
460 IF (G=42)+(GG=42)THEN 620
470 K=INT(RND*8+1)
480 CALL HCHAR(A(K),B(K),32)
490 A(K)=A(K)+D
500 B(K)=B(K)+E
510 D=-D
520 IF A(K)<2 THEN 700
530 IF A(K)>23 THEN 720
540 IF B(K)<4 THEN 740
550 IF B(K)>28 THEN 760
560 CALL GCHAR(A(K),B(K),H)
570 IF H>100 THEN 620
580 CALL HCHAR(A(K),B(K),42)
590 T=T+1
600 IF T<2 THEN 470
610 GOTO 320
620 ON N GOSUB 940,1310,1630,2090
630 N=N+1
640 IF N>4 THEN 2410
650 V=1
660 IF (A(V)=R)*(B(V)=C)THEN 780
670 IF (A(V)=R)*(B(V)=C+1)THEN 780
680 V=V+1
690 GOTO 660
700 A(K)=2
710 GOTO 540
```

Level 1 Games

```
720 A(K)=23
730 GOTO 540
740 B(K)=4
750 GOTO 580
760 B(K)=28
770 GOTO 580
780 A(V)=INT(RND*24+1)
790 B(V)=INT(RND*26+3)
800 CALL HCHAR(A(V),B(V),42)
810 GOTO 470
820 IF R=2 THEN 420
830 R=R-1
840 GOTO 420
850 IF C=28 THEN 420
860 C=C+2
870 GOTO 420
880 IF R=23 THEN 420
890 R=R+1
900 GOTO 420
910 IF C=4 THEN 420
920 C=C-2
930 GOTO 420
940 REM TWINKLE TWINKLE LITTLE STAR
950 CALL SCREEN(11)
960 CALL COLOR(2,2,1)
970 CALL COLOR(13,2,1)
980 Q=0
990 CALL SOUND(350,262,2)
1000 CALL SOUND(350,262,2)
1010 CALL SOUND(350,392,2)
1020 CALL SOUND(350,392,2)
1030 CALL SOUND(350,440,2)
1040 CALL SOUND(350,440,2)
1050 CALL SOUND(550,392,2)
1060 FOR I=1 TO 80
1070 NEXT I
1080 CALL SOUND(350,349,2)
1090 CALL SOUND(350,349,2)
1100 CALL SOUND(350,330,2)
1110 CALL SOUND(350,330,2)
1120 CALL SOUND(350,294,2)
1130 CALL SOUND(350,294,2)
1140 CALL SOUND(550,262,2)
1150 IF Q=2 THEN 1300
1160 FOR I=1 TO 150
1170 NEXT I
1180 Q=Q+1
1190 CALL SOUND(350,392,2)
1200 CALL SOUND(350,392,2)
```

Level 1 Games

```
1210 CALL SOUND(350,349,2)
1220 CALL SOUND(350,349,2)
1230 CALL SOUND(350,330,2)
1240 CALL SOUND(350,330,2)
1250 CALL SOUND(550,294,2)
1260 FOR I=1 TO 80
1270 NEXT I
1280 IF Q=1 THEN 1180
1290 IF Q=2 THEN 990
1300 RETURN
1310 REM OLD FOLKS AT HOME
1320 CALL SCREEN(8)
1330 P=1
1340 CALL SOUND(450,330,2)
1350 CALL SOUND(250,294,2)
1360 CALL SOUND(250,262,2)
1370 CALL SOUND(250,330,2)
1380 CALL SOUND(250,294,2)
1390 CALL SOUND(450,262,2)
1400 CALL SOUND(450,523,2)
1410 CALL SOUND(250,440,2)
1420 CALL SOUND(450,523,2)
1430 FOR I=1 TO 100
1440 NEXT I
1450 IF P=2 THEN 1540
1460 P=2
1470 CALL SOUND(450,392,2)
1480 CALL SOUND(250,330,2)
1490 CALL SOUND(250,262,2)
1500 CALL SOUND(600,294,2)
1510 FOR I=1 TO 150
1520 NEXT I
1530 GOTO 1340
1540 CALL SOUND(450,392,2)
1550 CALL SOUND(250,330,2)
1560 CALL SOUND(150,262,2)
1570 CALL SOUND(450,294,2)
1580 CALL SOUND(450,294,2)
1590 CALL SOUND(600,262,2)
1600 FOR I=1 TO 200
1610 NEXT I
1620 RETURN
1630 REM OH SUSANNA
1640 CALL SCREEN(10)
1650 Q=1
1660 QQ=1
1670 CALL SOUND(200,262,2)
1680 CALL SOUND(200,294,2)
1690 CALL SOUND(300,330,2)
```

Level 1 Games

```
1700 CALL SOUND(300,392,2)
1710 CALL SOUND(300,392,2)
1720 CALL SOUND(300,440,2)
1730 CALL SOUND(300,392,2)
1740 CALL SOUND(300,330,2)
1750 CALL SOUND(400,262,2)
1760 CALL SOUND(200,294,2)
1770 CALL SOUND(300,330,2)
1780 CALL SOUND(300,330,2)
1790 CALL SOUND(300,294,2)
1800 IF Q=2 THEN 1870
1810 Q=2
1820 CALL SOUND(300,262,2)
1830 CALL SOUND(500,294,2)
1840 FOR I=1 TO 100
1850 NEXT I
1860 GOTO 1670
1870 CALL SOUND(300,294,2)
1880 CALL SOUND(500,262,2)
1890 IF QQ=2 THEN 2080
1900 FOR I=1 TO 150
1910 NEXT I
1920 CALL SOUND(600,349,2)
1930 CALL SOUND(600,349,2)
1940 CALL SOUND(300,440,2)
1950 CALL SOUND(600,440,2)
1960 FOR I=1 TO 80
1970 NEXT I
1980 CALL SOUND(300,440,2)
1990 CALL SOUND(300,392,2)
2000 CALL SOUND(300,392,2)
2010 CALL SOUND(300,330,2)
2020 CALL SOUND(300,262,2)
2030 CALL SOUND(600,294,2)
2040 FOR I=1 TO 100
2050 NEXT I
2060 QQ=2
2070 GOTO 1670
2080 RETURN
2090 REM LONDON BRIDGE
2100 CALL SCREEN(2)
2110 CALL COLOR(2,16,1)
2120 CALL COLOR(13,16,1)
2130 Q=1
2140 CALL SOUND(500,392,2)
2150 CALL SOUND(200,440,2)
2160 CALL SOUND(300,392,2)
2170 CALL SOUND(300,349,2)
2180 CALL SOUND(300,330,2)
```

Level 1 Games

```
2190 CALL SOUND(300,349,2)
2200 CALL SOUND(500,392,2)
2210 FOR I=1 TO 80
2220 NEXT I
2230 IF Q=2 THEN 2360
2240 CALL SOUND(300,294,2)
2250 CALL SOUND(300,330,2)
2260 CALL SOUND(500,349,2)
2270 FOR I=1 TO 80
2280 NEXT I
2290 CALL SOUND(300,330,2)
2300 CALL SOUND(300,349,2)
2310 CALL SOUND(500,392,2)
2320 FOR I=1 TO 150
2330 NEXT I
2340 Q=Q+1
2350 GOTO 2140
2360 CALL SOUND(500,294,2)
2370 CALL SOUND(500,392,2)
2380 CALL SOUND(300,330,2)
2390 CALL SOUND(500,262,2)
2400 RETURN
2410 N=1
2420 GOTO 650
```

Introduction to Addition

Skill area: Mathematics**Level: 1, 2**

Once you've mastered "Number Concepts" you are ready for "Introduction to Addition."

The program first asks what the minimum and maximum numbers are for the problems. The minimum can be any number between one and six, and the maximum can be any number between four and nine. The maximum must be at least three greater than the minimum.

Once the minimum and the maximum number have been entered, the program will randomly produce addition problems in which both numbers will be between the maximum and the minimum. As each number is presented, a row of squares appears beside the number to demonstrate it. You must enter the answer to the problem. If you are correct on the first try, the answer is shown, and the total number of boxes is displayed.

Suppose, for example, that the minimum number possible is two, and the maximum is six. The first problem might be six plus three. There would be a row of six boxes beside the six and three boxes beside the three. If you entered nine, the number nine would be shown, and there would be a row of nine boxes beside it.

You have three chances to enter the correct answer to a problem. After three incorrect responses, the correct answer is shown. Then a new problem appears.

If you get the correct answer to a problem on the first try, that problem will not appear again. Problems on which you do not get the correct answer on the first try will appear again later.

The program continues presenting problems until all possible problems except one have been answered correctly on the first try.

In order to learn the concept of addition, it is a good idea to start with the minimum of one and the maximum of four or five. As each problem appears, you should count the boxes corresponding to each of the two numbers. Then you should count the total

number of boxes to show that the sum of the number of boxes in each of the two rows is the same as the sum of the boxes corresponding to the answer.

Once you have begun to master the problems with the lower numbers, then the minimum and the maximum can be increased so that eventually you should be able to correctly add any two numbers between one and nine.

Introduction to Addition

```
100 REM  INTRO TO ADDITION
110 REM
120 CALL CLEAR
130 RANDOMIZE
140 DIM A(10,10)
150 CALL COLOR(13,9,9)
160 INPUT "MINIMUM  ":MIN
170 IF (MIN>0)*(MIN<7)THEN 200
180 PRINT ::"TRY AGAIN":
190 GOTO 160
200 INPUT "MAXIMUM  ":MAX
210 IF (MAX-MIN>2)*(MAX<10)THEN 240
220 PRINT ::"TRY AGAIN":
230 GOTO 200
240 CALL CLEAR
250 X=INT(RND*(MAX-MIN+1)+MIN)
260 Y=INT(RND*(MAX-MIN+1)+MIN)
270 IF (X=OLDX)*(Y=OLDY)THEN 250
280 IF A(X,Y)=1 THEN 250
290 E=0
300 OLDX=X
310 OLDY=Y
320 CALL HCHAR(10,6,X+48)
330 CALL HCHAR(12,6,Y+48)
340 FOR N=1 TO X
350 CALL HCHAR(10,6+2*N,128)
360 NEXT N
370 FOR N=1 TO Y
380 CALL HCHAR(12,6+2*N,128)
390 NEXT N
400 CALL HCHAR(13,5,95,3)
410 INPUT ANS
420 IF ANS=X+Y THEN 470
430 CALL SOUND(500,-3,3)
440 E=E+1
450 IF E=3 THEN 730
460 GOTO 410
470 CALL SOUND(50,300,3)
480 ANS$=STR$(ANS)
```

Level 1 Games

```
490 IF LEN(ANS$)=1 THEN 530
500 CALL HCHAR(14,5,VAL(SEG$(ANS$,1,1))+48)
510 CALL HCHAR(14,6,VAL(SEG$(ANS$,2,1))+48)
520 GOTO 540
530 CALL HCHAR(14,6,ANS+48)
540 IF E>0 THEN 570
550 A(X,Y)=1
560 C=C+1
570 IF ANS>10 THEN 620
580 FOR N=1 TO X+Y
590 CALL HCHAR(14,6+N*2,128)
600 NEXT N
610 GOTO 680
620 FOR N=1 TO 10
630 CALL HCHAR(14,6+N*2,128)
640 NEXT N
650 FOR N=1 TO ANS-10
660 CALL HCHAR(16,6+N*2,128)
670 NEXT N
680 PRINT "HIT ANY KEY TO CONTINUE."
690 CALL KEY(0,K,S)
700 IF S=0 THEN 690
710 IF C+1<(MAX-MIN+1)^2 THEN 240
720 END
730 FOR DELAY=1 TO 300
740 NEXT DELAY
750 ANS=X+Y
760 GOTO 480
```

Concept Learning

Skill area: Memory and Logic**Level: 1, 2**

Young children take great pride in being able to identify colors, shapes, and sizes. "Concept Learning" requires you to use this knowledge for problem solving.

Two objects are displayed on the screen. One of the two has been designated as *correct* according to a rule, and you have to figure out which one is correct by learning the rule. You make your choice by pushing the Q key to choose the left-hand object, and by pushing the P key to choose the right-hand object. If you are correct, a little man dances across the screen; if you're wrong, the screen goes dark for a moment, and the computer makes an unpleasant noise. Then the next display is presented. You will be correct only about half the time by guessing, but you'll be correct all the time as soon as you figure out the rule. Once you've made five correct choices in a row, the computer assumes that you have solved the problem and presents a new problem with a new rule.

The rule is always a simple rule such as pick the square, or pick the larger one, or pick the red one. These rules may seem extremely easy to adults, but are often difficult for children.

The program has three levels. If the first level is chosen, only one dimension (shape, color, or size) distinguishes the two objects. Thus, the problem is fairly simple, even for young children. If level 2 is selected, the two objects differ on two dimensions, and only one of the two dimensions is relevant. In other words, the rule is based on only one of the two dimensions, and you must learn to ignore the irrelevant one.

For example, the two objects on the screen might be a large red square and a small blue square. There are four possible rules for this problem: large is correct; small is correct; red is correct; blue is correct. The selection on the first round of a problem is always just a guess, but after a few rounds, you should be able to figure out which of the four possible rules is correct for a particular problem.

Level 3 involves two irrelevant characteristics, and thus is substantially more difficult. One object might be a small red square,

Level 1 Games

and the other is a large blue cross. Thus, there are six possible rules here: small is correct; large is correct; red is correct; blue is correct; cross is correct; square is correct. In this case you must learn to ignore two irrelevant dimensions or characteristics.

Because of the three levels of difficulty, this game is suitable for children at a wide range of ages. Preschoolers should be able to solve level 1 problems, but may encounter difficulty with levels 2 or 3. Kindergartners and first-graders should be able to solve level 2 problems, but may have difficulty with level 3. Even older grade-school children find level 3 a challenge.

Concept Learning

```
100 REM  CONCEPT LEARNING
110 REM
120 CALL CLEAR
130 RANDOMIZE
140 CALL SCREEN(16)
150 DIM A(2,9)
160 F=150
170 CALL CHAR(97,"1818FF18244242")
180 CALL CHAR(104,"FFFFFFFFFFFFFFFF")
190 CALL CHAR(105,"030303030303FFFF")
200 CALL CHAR(106,"C0C0C0C0C0C0FFFF")
210 CALL CHAR(107,"FFFF030303030303")
220 CALL CHAR(108,"FFFFC0C0C0C0C0C0")
230 CALL CHAR(112,"FFFFFFFFFFFFFFFF")
240 CALL CHAR(113,"030303030303FFFF")
250 CALL CHAR(114,"C0C0C0C0C0C0FFFF")
260 CALL CHAR(115,"FFFF030303030303")
270 CALL CHAR(116,"FFFFC0C0C0C0C0C0")
280 CALL COLOR(10,8,1)
290 CALL COLOR(11,9,1)
300 INPUT "DIFFICULTY LEVEL (1,2, OR 3)":L
310 IF (L=1)+(L=2)+(L=3)THEN 340
320 PRINT "TRY AGAIN."
330 GOTO 300
340 V=INT(RND*3+1)
350 V=(L-1)*3+V
360 IF V=VV THEN 340
370 VV=V
380 W=INT(RND*2+1)
390 X=INT(RND*2+1)
400 R=1
410 CALL CLEAR
420 PRINT TAB(25);R:::
430 Y=INT(RND*2+1)
440 Z=INT(RND*2+1)
```

Level 1 Games

```
450 IF (Z=ZZ)*(Y=YY)THEN 430
460 IF Z<>ZZ THEN 500
470 T=T+1
480 IF T>3 THEN 440
490 GOTO 510
500 T=0
510 ZZ=Z
520 YY=Y
530 ON V GOSUB 1000,1110,1220,1330,1560,1790,2020,
    2260,2500
540 FOR J=1 TO 2
550 D=ASC(SEG$(C$,J,1))-48
560 ON D GOSUB 2740,2780,2810,2840,2870,2910,2940,
    2970
570 NEXT J
580 FOR M=1 TO 3
590 FOR N=1 TO 3
600 CALL HCHAR(9+M,9+N,A(1,3*(M-1)+N))
610 CALL HCHAR(9+M,16+N,A(2,3*(M-1)+N))
620 NEXT N
630 NEXT M
640 CALL HCHAR(13,11,81)
650 CALL HCHAR(13,18,80)
660 CALL KEY(0,K,S)
670 IF (K=80)+(K=112)THEN 700
680 IF (K=81)+(K=113)THEN 720
690 GOTO 660
700 IF Z=2 THEN 730
710 GOTO 910
720 IF Z=2 THEN 910
730 FOR N=6 TO 26
740 CALL SOUND(50,300+F,3)
750 CALL VCHAR(10,N+1,32,4)
760 CALL HCHAR(11,N,97)
770 CALL HCHAR(11,N,32)
780 F=-F
790 NEXT N
800 P=P+1
810 IF P>4 THEN 840
820 R=R+1
830 GOTO 410
840 CALL CLEAR
850 PRINT TAB(11);"YOU WIN":::
860 PRINT TAB(11);"ROUND";R:::::
870 FOR DELAY=1 TO 1000
880 NEXT DELAY
890 P=0
900 GOTO 340
910 CALL SOUND(800,-3,3)
```

Level 1 Games

```
920 CALL CLEAR
930 CALL SCREEN(2)
940 FOR DELAY=1 TO 300
950 NEXT DELAY
960 CALL SCREEN(16)
970 P=0
980 R=R+1
990 GOTO 410
1000 IF X=Z THEN 1060
1010 IF Y=2 THEN 1040
1020 C$="21"
1030 RETURN
1040 C$="43"
1050 RETURN
1060 IF Y=2 THEN 1090
1070 C$="12"
1080 RETURN
1090 C$="34"
1100 RETURN
1110 IF X=Z THEN 1170
1120 IF Y=2 THEN 1150
1130 C$="51"
1140 RETURN
1150 C$="62"
1160 RETURN
1170 IF Y=2 THEN 1200
1180 C$="15"
1190 RETURN
1200 C$="26"
1210 RETURN
1220 IF X=Z THEN 1280
1230 IF Y=2 THEN 1260
1240 C$="42"
1250 RETURN
1260 C$="31"
1270 RETURN
1280 IF Y=2 THEN 1310
1290 C$="24"
1300 RETURN
1310 C$="13"
1320 RETURN
1330 IF W=2 THEN 1450
1340 IF X=Z THEN 1400
1350 IF Y=2 THEN 1380
1360 C$="61"
1370 RETURN
1380 C$="25"
1390 RETURN
1400 IF Y=2 THEN 1430
```

Level 1 Games

```
1410 C$="16"
1420 RETURN
1430 C$="52"
1440 RETURN
1450 IF X=Z THEN 1510
1460 IF Y=2 THEN 1490
1470 C$="41"
1480 RETURN
1490 C$="23"
1500 RETURN
1510 IF Y=2 THEN 1540
1520 C$="14"
1530 RETURN
1540 C$="32"
1550 RETURN
1560 IF W=2 THEN 1680
1570 IF X=Z THEN 1630
1580 IF Y=2 THEN 1610
1590 C$="61"
1600 RETURN
1610 C$="52"
1620 RETURN
1630 IF Y=2 THEN 1660
1640 C$="16"
1650 RETURN
1660 C$="25"
1670 RETURN
1680 IF X=Z THEN 1740
1690 IF Y=2 THEN 1720
1700 C$="71"
1710 RETURN
1720 C$="53"
1730 RETURN
1740 IF Y=2 THEN 1770
1750 C$="17"
1760 RETURN
1770 C$="35"
1780 RETURN
1790 IF W=2 THEN 1910
1800 IF X=Z THEN 1860
1810 IF Y=2 THEN 1840
1820 C$="41"
1830 RETURN
1840 C$="32"
1850 RETURN
1860 IF Y=2 THEN 1890
1870 C$="14"
1880 RETURN
1890 C$="23"
```

Level 1 Games

```
1900 RETURN
1910 IF X=Z THEN 1970
1920 IF Y=2 THEN 1950
1930 C$="71"
1940 RETURN
1950 C$="35"
1960 RETURN
1970 IF Y=2 THEN 2000
1980 C$="17"
1990 RETURN
2000 C$="53"
2010 RETURN
2020 W=INT(RND*2+1)
2030 IF W=2 THEN 2150
2040 IF X=Z THEN 2100
2050 IF Y=2 THEN 2080
2060 C$="81"
2070 RETURN
2080 C$="63"
2090 RETURN
2100 IF Y=2 THEN 2130
2110 C$="18"
2120 RETURN
2130 C$="36"
2140 RETURN
2150 IF X=Z THEN 2210
2160 IF Y=2 THEN 2190
2170 C$="45"
2180 RETURN
2190 C$="27"
2200 RETURN
2210 IF Y=2 THEN 2240
2220 C$="54"
2230 RETURN
2240 C$="72"
2250 RETURN
2260 W=INT(RND*2+1)
2270 IF W=2 THEN 2390
2280 IF X=Z THEN 2340
2290 IF Y=2 THEN 2320
2300 C$="81"
2310 RETURN
2320 C$="72"
2330 RETURN
2340 IF Y=2 THEN 2370
2350 C$="18"
2360 RETURN
2370 C$="27"
2380 RETURN
```

```
2390 IF X=Z THEN 2450
2400 IF Y=2 THEN 2430
2410 C$="63"
2420 RETURN
2430 C$="54"
2440 RETURN
2450 IF Y=2 THEN 2480
2460 C$="36"
2470 RETURN
2480 C$="45"
2490 RETURN
2500 W=INT(RND*2+1)
2510 IF W=2 THEN 2630
2520 IF X=Z THEN 2580
2530 IF Y=2 THEN 2560
2540 C$="36"
2550 RETURN
2560 C$="45"
2570 RETURN
2580 IF Y=2 THEN 2610
2590 C$="63"
2600 RETURN
2610 C$="54"
2620 RETURN
2630 IF X=Z THEN 2690
2640 IF Y=2 THEN 2670
2650 C$="72"
2660 RETURN
2670 C$="81"
2680 RETURN
2690 IF Y=2 THEN 2720
2700 C$="27"
2710 RETURN
2720 C$="18"
2730 RETURN
2740 FOR N=1 TO 9
2750 A(J,N)=104
2760 NEXT N
2770 RETURN
2780 H=104
2790 GOSUB 3000
2800 RETURN
2810 H=104
2820 GOSUB 3100
2830 RETURN
2840 H=104
2850 GOSUB 3190
2860 RETURN
2870 FOR N=1 TO 9
```

Level 1 Games

```
2880 A(J,N)=112
2890 NEXT N
2900 RETURN
2910 H=112
2920 GOSUB 3000
2930 RETURN
2940 H=112
2950 GOSUB 3100
2960 RETURN
2970 H=112
2980 GOSUB 3190
2990 RETURN
3000 A(J,1)=32
3010 A(J,2)=H
3020 A(J,3)=32
3030 A(J,4)=H
3040 A(J,5)=H
3050 A(J,6)=H
3060 A(J,7)=32
3070 A(J,8)=H
3080 A(J,9)=32
3090 RETURN
3100 FOR N=1 TO 4
3110 A(J,N)=32
3120 NEXT N
3130 A(J,5)=H
3140 A(J,6)=H
3150 A(J,7)=32
3160 A(J,8)=H
3170 A(J,9)=H
3180 RETURN
3190 FOR N=1 TO 4
3200 A(J,N)=32
3210 NEXT N
3220 A(J,5)=H+1
3230 A(J,6)=H+2
3240 A(J,7)=32
3250 A(J,8)=H+3
3260 A(J,9)=H+4
3270 RETURN
```

Maze

Skill area: Coordination**Level: 1, 2, 3**

"Maze" is a simple game that can be played by several children competing against each other or by one child trying to improve on his best score. In addition, it can be used to develop eye/hand coordination for young children.

A simple maze is displayed on the screen. There is a star in the upper-left corner. The object of the game is to steer the star through the maze to the opening in the lower-right corner as quickly as possible. This is done with three of the arrow keys. The D key moves the star to the right, the E key moves the star up, and the X key moves the star down. There is never any need to move the star to the left, so the left arrow (the S key) has no effect. Likewise, none of the other keys have any effect on the movement of the star.

There is a timer in the lower-right corner of the screen. The timer is started when the first key is struck, and it continues running until the star reaches the opening in the lower-right corner. The lower the number on the timer, the better the performance.

At the completion of a round, the computer will ask if the player wishes to play again. The Y key resets the timer to zero and returns the star to the upper-left corner. The N key terminates the game.

In order for this program to work, the ALPHA LOCK key must be in the down (on) position.

The program can be easily modified so that it can be played using a joystick instead of the keys. Change the following lines:

```
380 CALL JOYST(1,X,Y)
390 IF (X=0)*(Y=0)THEN 380
410 CALL JOYST(1,X,Y)
420 IF (X=0)*(Y=-4)THEN 590
430 IF (X=4)*(Y=0)THEN 630
440 IF (X=0)*(Y=4)THEN 550
```

With joysticks, the ALPHA LOCK key must be up in order for the program to run.

Level 1 Games

Maze

```
100 REM MAZE
110 REM
120 CALL CLEAR
130 RANDOMIZE
140 CALL SCREEN(16)
150 CALL COLOR(2,9,1)
160 CALL CHAR(128,"7E7E7E7E7E7E7E7E")
170 CALL CHAR(129,"FFFFFFFFFFFFFFFF")
180 CALL HCHAR(1,4,129,25)
190 CALL HCHAR(20,4,129,25)
200 CALL VCHAR(1,4,129,20)
210 CALL VCHAR(1,28,129,20)
220 FOR J=6 TO 26 STEP 2
230 CALL VCHAR(2,J,128,18)
240 R=INT(RND*18+2)
250 CALL HCHAR(R,J,32)
260 NEXT J
270 ROW=2
280 OLDROW=ROW
290 COL=5
300 OLDCOL=COL
310 CALL HCHAR(20,27,97)
320 CALL COLOR(9,1,1)
330 CALL HCHAR(ROW,COL,42)
340 SCORE1=0
350 SCORE2=0
360 SCORE3=0
370 CALL HCHAR(22,26,48+SCORE1)
380 CALL KEY(0,K,S)
390 IF S=0 THEN 380
400 REM LOOP BEGINS
410 CALL KEY(0,K,S)
420 IF (K=88)+(K=120)THEN 590
430 IF (K=68)+(K=100)THEN 630
440 IF (K=69)+(K=101)THEN 550
450 CALL GCHAR(ROW,COL,G)
460 IF (G=128)+(G=129)THEN 670
470 CALL HCHAR(OLDROW,OLDCOL,32)
480 CALL HCHAR(ROW,COL,42)
490 IF G=97 THEN 700
500 CALL SOUND(75,300,2)
510 SCORE1=SCORE1+1
520 IF SCORE1=10 THEN 880
530 CALL HCHAR(22,26,48+SCORE1)
540 GOTO 400
550 OLDROW=ROW
560 OLDCOL=COL
570 ROW=ROW-1
```

```
580 GOTO 450
590 OLDROW=ROW
600 OLDCOL=COL
610 ROW=ROW+1
620 GOTO 450
630 OLDCOL=COL
640 OLDROW=ROW
650 COL=COL+1
660 GOTO 450
670 ROW=OLDROW
680 COL=OLDCOL
690 GOTO 480
700 CALL HCHAR(22,5,65)
710 CALL HCHAR(22,6,71)
720 CALL HCHAR(22,7,65)
730 CALL HCHAR(22,8,73)
740 CALL HCHAR(22,9,78)
750 CALL HCHAR(22,11,40)
760 CALL HCHAR(22,12,89)
770 CALL HCHAR(22,14,79)
780 CALL HCHAR(22,15,82)
790 CALL HCHAR(22,17,78)
800 CALL HCHAR(22,18,41)
810 CALL KEY(0,K,S)
820 IF (K=89)+(K=121)THEN 850
830 IF (K=78)+(K=110)THEN 870
840 GOTO 810
850 CALL HCHAR(22,3,32,29)
860 GOTO 270
870 END
880 SCORE1=0
890 SCORE2=SCORE2+1
900 IF SCORE2=10 THEN 930
910 CALL HCHAR(22,25,48+SCORE2)
920 GOTO 530
930 SCORE2=0
940 SCORE3=SCORE3+1
950 CALL HCHAR(22,24,SCORE3+48)
960 GOTO 910
```

Matching Game

Skill area: Memory

Level: 1, 2, 3

Players from preschoolers to adults can have fun testing their memory skills in "Matching Game."

Twenty-four boxes are displayed on the screen, lettered A to X. Initially all of the boxes are empty. There is a total of 12 patterns, and each box has a pattern associated with it (you can think of the pattern as being inside the box). Each of the 12 patterns is inside exactly two of the boxes.

You enter a letter between A and X, and the pattern inside that box is displayed. You then enter the letter corresponding to a second box, and the pattern inside that box appears. Then hit the ENTER key. If the two patterns are the same, the computer plays a little tune, and both boxes disappear. If the two patterns are different, the boxes close up again.

The player's goal is to clear the screen in as few turns as possible. Since the screen is cleared by pairing identical patterns, you must remember where they are. At first you will be guessing, but within a few turns, you will turn up patterns that have been seen before. The program keeps track of the number of turns that have been taken.

The ALPHA LOCK key must be down for this program to work. This program was written by Frank DiDomenico.

Matching Game

```
100 REM  MATCHING GAME
110 REM  FRANK DIDOMENICO
120 CALL CLEAR
130 PRINT "{4 SPACES}PLEASE WAIT A MOMENT"
140 FOR QQ=1 TO 12
150 PRINT
160 NEXT QQ
170 DIM CR(24),PATTERN(12),RR(24),CC(24)
180 FOR QQ=1 TO 24
190 READ RR(QQ),CC(QQ)
200 NEXT QQ
210 RANDOMIZE
220 CALL COLOR(9,7,16)
230 CALL COLOR(10,2,16)
```

Level 1 Games

240 CALL COLOR(11,13,16)
250 CALL COLOR(12,16,2)
260 CALL COLOR(13,2,16)
270 CALL COLOR(14,5,16)
280 CALL CHAR(92,"FF80808080808080")
290 CALL CHAR(93,"FF01010101010101")
300 CALL CHAR(94,"80808080808080FF")
310 CALL CHAR(95,"01010101010101FF")
320 REM HEART
330 CALL CHAR(96,"00001C3E7F7F7F7F")
340 CALL CHAR(97,"0000387CFEFEFEFE")
350 CALL CHAR(98,"3F1F0F070301")
360 CALL CHAR(99,"FCF8F0E0C080")
370 REM{3 SPACES}SPADE
380 CALL CHAR(104,"0000010303070F1F")
390 CALL CHAR(105,"000080C0C0E0F0F8")
400 CALL CHAR(106,"3F7F7F7D390103")
410 CALL CHAR(107,"FCFEFEFE9C80C0")
420 REM CLUB
430 CALL CHAR(108,"0000030707070301")
440 CALL CHAR(109,"0000C0E0E0E0C080")
450 CALL CHAR(110,"3B7F7F7D390103")
460 CALL CHAR(111,"DCFEFEFE9C80C")
470 REM NESTED SQUARES
480 CALL CHAR(128,"FFFFC0C0CFCFCCCC")
490 CALL CHAR(129,"FFFF0303F3F33333")
500 CALL CHAR(130,"CCCCFCFC0C0FFFFF")
510 CALL CHAR(131,"3333F3F30303FFFF")
520 REM DIAMOND
530 CALL CHAR(100,"000103070F1F3F7F")
540 CALL CHAR(101,"0080C0E0F0F8FCFE")
550 CALL CHAR(102,"7F3F1F0F070301")
560 CALL CHAR(103,"FEFCF8F0E0C080")
570 REM TELEPHONE
580 CALL CHAR(136,"00000000F7F77777")
590 CALL CHAR(137,"00000000F0FEEEEEE")
600 CALL CHAR(138,"07073F3F")
610 CALL CHAR(139,"E0E0FCFC")
620 REM FACE
630 CALL CHAR(140,"0F1020408C8C8081")
640 CALL CHAR(141,"F008040231310181")
650 CALL CHAR(142,"819088874020100F")
660 CALL CHAR(143,"810911E1020408F0")
670 REM WHITE CROSS
680 CALL CHAR(124,"0707070707FFFFFF")
690 CALL CHAR(125,"E0E0E0E0E0FFFFFF")
700 CALL CHAR(126,"FFFFFF07070707")
710 CALL CHAR(127,"FFFFFFE0E0E0E0E0")
720 REM CHECKERBOARD

Level 1 Games

```
730 FOR X=120 TO 123
740 CALL CHAR(X,"CCCC3333CCCC3333")
750 NEXT X
760 REM{3 SPACES}FOUR TRIANGLES
770 CALL CHAR(116,"FFFEFCF8F0E0C080")
780 CALL CHAR(117,"FFFEFCF8F0E0C080")
790 CALL CHAR(118,"0103070F1F3F7FFF")
800 CALL CHAR(119,"0103070F1F3F7FFF")
810 REM{3 SPACES}LARGE TRIANGLE
820 CALL CHAR(112,"0")
830 CALL CHAR(113,"0103070F1F3F7FFF")
840 CALL CHAR(114,"0103070F1F3F7FFF")
850 CALL CHAR(115,"FFFFFFFFFFFFFFFF")
860 REM{3 SPACES}BLACK CROSS
870 CALL CHAR(132,"0707070707FFFFFF")
880 CALL CHAR(133,"E0E0E0E0E0FFFFFF")
890 CALL CHAR(134,"FFFFFF0707070707")
900 CALL CHAR(135,"FFFFFFE0E0E0E0E0")
910 REM SCREEN FORMAT
920 PRINT "{7 SPACES}MATCHING GAME":
930 PRINT "{4 SPACES}A{3 SPACES}B{3 SPACES}C
      {3 SPACES}D{3 SPACES}E{3 SPACES}F":
940 PRINT "{4 SPACES}G{3 SPACES}H{3 SPACES}I
      {3 SPACES}J{3 SPACES}K{3 SPACES}L":
950 PRINT "{4 SPACES}M{3 SPACES}N{3 SPACES}O
      {3 SPACES}P{3 SPACES}Q{3 SPACES}R":
960 PRINT "{4 SPACES}S{3 SPACES}T{3 SPACES}U
      {3 SPACES}V{3 SPACES}W{3 SPACES}X":
970 PRINT "NUMBER OF TRY:"
980 C=2
990 R=5
1000 N=92
1010 REM DRAW EMPTY BOXES
1020 FOR BXR=1 TO 4
1030 FOR BX=1 TO 6
1040 C=C+4
1050 GOSUB 1420
1060 NEXT BX
1070 R=R+4
1080 C=2
1090 NEXT BXR
1100 R=22
1110 C=2
1120 M$="PLEASE WAIT FOR A MOMENT"
1130 GOSUB 2190
1140 FOR CELL=1 TO 24
1150 X=INT(RND*12)+1
1160 IF PATTERN(X)>1 THEN 1150
1170 PATTERN(X)=PATTERN(X)+1
```

```
1180 CR(CELL)=X
1190 NEXT CELL
1200 CALL HCHAR(22,3,32,24)
1210 R=22
1220 C=2
1230 M$="YOU MAY BEGIN"
1240 GOSUB 2190
1250 CALL KEY(0,KEY,STATUS)
1260 IF STATUS=0 THEN 1250
1270 IF TRY>0 THEN 1290
1280 CALL HCHAR(22,3,32,13)
1290 FIR=KEY
1300 IF (KEY>64)*(KEY<89)THEN 1330
1310 CALL SOUND(500,-3,2)
1320 GOTO 1250
1330 GOSUB 1480
1340 CALL KEY(0,KEY,STATUS)
1350 IF STATUS=0 THEN 1340
1360 IF KEY=FIR THEN 1400
1370 IF KEY>88 THEN 1400
1380 IF KEY<65 THEN 1400
1390 GOSUB 1480
1400 CALL SOUND(500,-3,2)
1410 GOTO 1340
1420 REM DRAWING SUBROUTINE
1430 CALL HCHAR(R,C,N)
1440 CALL HCHAR(R,C+1,N+1)
1450 CALL HCHAR(R+1,C,N+2)
1460 CALL HCHAR(R+1,C+1,N+3)
1470 RETURN
1480 REM SHOW PICKS
1490 PP=KEY-64
1500 N=92+4*CR(PP)
1510 IF PP>12 THEN 1550
1520 R=RR(PP)
1530 C=CC(PP)
1540 GOTO 1670
1550 R=RR(PP)
1560 C=CC(PP)
1570 GOTO 1670
1580 DATA 5,6,5,10,5,14
1590 DATA 5,18,5,22,5,26
1600 DATA 9,6,9,10,9,14
1610 DATA 9,18,9,22,9,26
1620 DATA 13,6,13,10,13,14
1630 DATA 13,18,13,22,13,26
1640 DATA 17,6,17,10,17,14
1650 DATA 17,18,17,22,17,26
1660 GOTO 1670
```

Level 1 Games

```
1670 IF WQ=1 THEN 1710
1680 CALL GCHAR(R-1,C+1,CK)
1690 IF CK=32 THEN 1310
1700 GOTO 1730
1710 CALL GCHAR(R-1,C+1,CK)
1720 IF CK=32 THEN 1400
1730 GOSUB 1420
1740 WQ=WQ+1
1750 IF WQ=2 THEN 1800
1760 R1=R
1770 C1=C
1780 PP1=CR(PP)
1790 RETURN
1800 CALL KEY(0,KEY,STATUS)
1810 IF STATUS=0 THEN 1800
1820 IF KEY<>13 THEN 1800
1830 TRY=TRY+1
1840 TRYT=INT(TRY/10)
1850 TRY0=TRY-TRYT*10
1860 A$=STR$(TRYT)
1870 B$=STR$(TRY0)
1880 IF TRY<10 THEN 1900
1890 CALL HCHAR(20,18,ASC(A$))
1900 CALL HCHAR(20,19,ASC(B$))
1910 CALL VCHAR(20,12,32,2)
1920 R2=R
1930 C2=C
1940 PP2=CR(PP)
1950 IF PP1<>PP2 THEN 2100
1960 FOR PT=1 TO 7
1970 RTU=RND*1300+110
1980 CALL SOUND(175,RTU,4)
1990 NEXT PT
2000 CALL HCHAR(R1-1,C1,32,3)
2010 CALL HCHAR(R1,C1,32,3)
2020 CALL HCHAR(R1+1,C1,32,3)
2030 CALL HCHAR(R2-1,C2,32,3)
2040 CALL HCHAR(R2,C2,32,3)
2050 CALL HCHAR(R2+1,C2,32,3)
2060 WQ=0
2070 RT=RT+1
2080 IF RT<>12 THEN 1250
2090 GOTO 2250
2100 R=R1
2110 C=C1
2120 N=92
2130 GOSUB 1420
2140 R=R2
2150 C=C2
```

Level 1 Games

```
2160 GOSUB 1420
2170 WQ=0
2180 GOTO 1250
2190 REM PRINT CHARACTERS
2200 FOR II=1 TO LEN(M$)
2210 CODE=ASC(SEG$(M$,II,1))
2220 CALL HCHAR(R,C+II,CODE)
2230 NEXT II
2240 RETURN
2250 RT=0
2260 FOR DELAY=1 TO 700
2270 NEXT DELAY
2280 CALL CLEAR
2290 PRINT "IT TOOK YOU ";(TRY);TAB(17);"TRYs TO"
2300 PRINT "FINISH THE GAME."
2310 PRINT ::
2320 TRY=0
2330 INPUT "IF YOU WANT TO PLAY AGAIN{3 SPACES}ENTER Y, IF NOT ENTER N : ":Q$
2340 IF ASC(Q$)=89 THEN 2420
2350 IF ASC(Q$)<>78 THEN 2330
2360 PRINT ::
2370 PRINT "SEE YOU NEXT TIME!":::
2380 FOR DELAY=1 TO 500
2390 NEXT DELAY
2400 CALL CLEAR
2410 END
2420 FOR N=1 TO 12
2430 PATTERN(N)=0
2440 NEXT N
2450 CALL CLEAR
2460 GOTO 910
```


Anti-Aircraft

Skill area: Coordination

Level: 1, 2

"Anti-Aircraft" is the only shoot-em-up arcade-type game included in this book. In Anti-Aircraft you operate an anti-aircraft gun at the bottom of the screen. Hitting the two arrow keys, S and D, moves the gun back and forth across the screen, and hitting the F key fires the gun. The goal is to shoot down as many enemy planes as possible while avoiding the bombs the enemy planes drop on the gun. The amount of ammunition is limited to 50 bullets, so you should not shoot unless you are fairly certain that you will hit a plane. In order to score a hit, it is necessary to lead your shot; that is, you should fire in front of where the plane actually is so that the bullet will in fact hit the moving plane.

The computer keeps track of the number of planes that are hit. The game is over when one of three things happens: you run out of ammunition; 50 planes have flown overhead; or a bomb from one of the planes hits your gun.

Anti-Aircraft

```
100 REM  ANTI-AIRCRAFT
110 REM
120 CALL CLEAR
130 DIM RR(10),CC(10)
140 RANDOMIZE
150 FOR N=1 TO 10
160 RR(N)=1
170 CC(N)=16
180 NEXT N
190 BR=22
200 BC=16
210 CALL CHAR(97,"181818181818FFFF")
220 CALL CHAR(98,"0000001818")
230 CALL CHAR(99,"FFFFFFFFFFFFFFFF")
240 CALL CHAR(100,"0000181818180000")
250 CALL HCHAR(23,3,99,28)
260 COL=16
270 CALL HCHAR(22,COL,97)
280 CALL HCHAR(22,3,99,10)
290 CALL HCHAR(22,20,99,11)
300 A=5
```

```
310 AA=0
320 SCORE=0
330 SCORE2=0
340 CALL HCHAR(24,25,A+48)
350 CALL HCHAR(24,26,AA+48)
360 SIDE=INT(RND*2+1)
370 C=5
380 IF SIDE=1 THEN 410
390 SIDE=-1
400 C=28
410 R=INT(RND*10+10)
420 CALL HCHAR(R,C,42)
430 COUNT=COUNT+1
440 IF COUNT>50 THEN 1360
450 CALL KEY(0,K,S)
460 IF K=83 THEN 830
470 IF K=68 THEN 880
480 IF K=70 THEN 930
490 IF BR=22 THEN 590
500 CALL HCHAR(BR,BC,32)
510 BR=BR+1
520 IF BR<22 THEN 580
530 CALL GCHAR(BR,BC,G)
540 CALL GCHAR(BR,BC+1,GG)
550 CALL GCHAR(BR,BC-1,GGG)
560 IF (G=97)+(GG=97)+(GGG=97) THEN 1320
570 GOTO 590
580 CALL HCHAR(BR,BC,100)
590 FOR N=1 TO 10
600 IF RR(N)<2 THEN 680
610 CALL HCHAR(RR(N),CC(N),32)
620 RR(N)=RR(N)-1
630 CALL GCHAR(RR(N),CC(N),G)
640 IF G=42 THEN 1120
650 CALL HCHAR(RR(N),CC(N),98)
660 IF RR(N)>2 THEN 680
670 CALL HCHAR(RR(N),CC(N),32)
680 NEXT N
690 CALL HCHAR(R,C,32)
700 C=C+SIDE
710 IF (SIDE=-1)*(C<12) THEN 360
720 IF (SIDE=1)*(C>20) THEN 360
730 CALL GCHAR(R,C,G)
740 IF G=98 THEN 1090
750 CALL HCHAR(R,C,42)
760 IF C<>COL THEN 450
770 IF BR=22 THEN 790
780 CALL HCHAR(BR,BC,32)
790 BR=R+1
```

Level 1 Games

```
800 BC=C
810 CALL HCHAR(BR,BC,100)
820 GOTO 450
830 IF COL=13 THEN 590
840 CALL HCHAR(22,COL,32)
850 COL=COL-1
860 CALL HCHAR(22,COL,97)
870 GOTO 590
880 IF COL=19 THEN 590
890 CALL HCHAR(22,COL,32)
900 COL=COL+1
910 CALL HCHAR(22,COL,97)
920 GOTO 590
930 M=M+1
940 IF M<11 THEN 960
950 M=1
960 CC(M)=COL
970 RR(M)=21
980 CALL SOUND(50,-7,3)
990 CALL HCHAR(RR(M),CC(M),98)
1000 AA=AA-1
1010 IF AA=-1 THEN 1040
1020 CALL HCHAR(24,26,AA+48)
1030 GOTO 590
1040 A=A-1
1050 IF A=-1 THEN 1360
1060 CALL HCHAR(24,25,A+48)
1070 AA=9
1080 GOTO 1020
1090 FOR N=1 TO 10
1100 IF (RR(N)=R)*(CC(N)=C) THEN 1120
1110 NEXT N
1120 CALL SOUND(1000,-7,3)
1130 CALL HCHAR(R,C,32)
1140 X=98
1150 GOSUB 1270
1160 X=32
1170 GOSUB 1270
1180 RR(N)=1
1190 SCORE=SCORE+1
1200 IF SCORE=10 THEN 1230
1210 CALL HCHAR(24,6,SCORE+48)
1220 GOTO 350
1230 SCORE2=SCORE2+1
1240 SCORE=0
1250 CALL HCHAR(24,5,SCORE2+48)
1260 GOTO 1210
1270 CALL HCHAR(R+1,C,X)
1280 CALL HCHAR(R,C-1,X)
```

Level 1 Games

```
1290 CALL HCHAR(R-1,C,X)
1300 CALL HCHAR(R,C+1,X)
1310 RETURN
1320 CALL SOUND(1000,-7,3)
1330 CALL HCHAR(22,13,32,7)
1340 FOR DELAY=1 TO 1000
1350 NEXT DELAY
1360 CALL CLEAR
1370 PRINT TAB(11);"GAME OVER":::::::::
1380 PRINT "  YOU SHOT DOWN";10*SCORE2+SCORE;"PLAN
    ES.":::::::::
1390 END
```

Arithmetic Practice

Skill area: Mathematics

Level: 1, 2, 3

Practice! Practice! Practice! We were told that was the best way to learn our arithmetic facts. But practice was so boring. Then came the computer.

Children don't mind practice quite so much when it involves the use of their computer. This is the idea behind "Arithmetic Practice."

Arithmetic Practice allows you to practice any of the four basic arithmetic functions. Once you have decided which type of problem to practice, you must select the range of numbers for the problems. This allows you to practice at the appropriate level. When asked for the range of the first number, you should enter two numbers separated by a comma. The second number must be equal to or greater than the first. The computer then asks for the range of the second number, and the child enters two numbers again.

Suppose it is a subtraction problem. The first number is the number that the second number will be subtracted from. For someone who is just learning subtraction, the range entered might be 5 to 9. The second number is the number to be subtracted from the first number. For our example, suppose that the range entered was 1 to 4. Thus, the program would generate problems in which the top number would be any number between 5 and 9, and the bottom number would be any number between 1 and 4. Thus, the following problems might be presented:

$$\begin{array}{r} 6 \\ -1 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ -4 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ -2 \\ \hline \end{array}$$

The program also asks how many problems you want, and any number can be entered.

Division presents special problems. If you indicate division problems, the program then asks which of three possible options you want. Option 1 includes only those problems which come out even — without a remainder or decimal in the answer. Option 2 involves problems which can have a remainder. In this case, after you enter the answer, the program asks for the remainder,

and you must get both the answer and the remainder correct. The third option involves carrying each answer out to three decimal places.

In division problems, the first number is the dividend and the second number is the divisor. In other words, the format will be "first number divided by second number."

Care must be taken when entering the range of numbers for division problems. Be sure the range of numbers for the first number is greater than the range of numbers for the second. For example, if you enter 6, 10 for the first number be sure that the range for the second number begins below 6 (3, 8 would be acceptable).

Arithmetic Practice

```
100 REM  ARITHMETIC PRACTICE
110 REM
120 CALL CLEAR
130 PRINT TAB(4);"ARITHMETIC PROBLEMS"::::
140 PRINT " WHAT KIND OF PROBLEMS DO{4 SPACES}YOU
    WANT?"::::
150 PRINT TAB(4);"ADDITION (1)"
160 PRINT TAB(4);"SUBTRACTION (2)"
170 PRINT TAB(4);"MULTIPLICATION (3)"
180 PRINT TAB(4);"DIVISION (4)"::::
190 INPUT T
200 IF (T>0)*(T<5)THEN 230
210 PRINT ::"TRY AGAIN":::
220 GOTO 120
230 IF T=4 THEN 1020
240 PRINT ::"ENTER THE RANGE OF THE{6 SPACES}FIRS
    T NUMBER (2 NUMBERS{5 SPACES}SEPARATED BY A CO
    MMA)"
250 INPUT A,B
260 IF A>B THEN 960
270 PRINT
280 PRINT "ENTER THE RANGE OF THE{6 SPACES}SECOND
    NUMBER (2 NUMBERS{4 SPACES}SEPARATED BY A COMM
    A)"
290 INPUT C,D
300 IF C>D THEN 980
310 RANDOMIZE
320 PRINT ::"HOW MANY PROBLEMS DO YOU{4 SPACES}WAN
    T?"
330 INPUT N
340 FOR J=1 TO N
350 F=INT(RND*(1+B-A)+A)
360 G=INT(RND*(1+D-C)+C)
```

Level 1 Games

```
370 LF=LEN(STR$(F))
380 LG=LEN(STR$(G))
390 CALL CLEAR
400 ON T GOTO 610,670,750,810
410 INPUT "{4 SPACES}":GUESS
420 IF (T=4)*(TT=2)THEN 1120
430 IF GUESS=ANS THEN 480
440 PRINT "WRONG! TRY AGAIN."
450 FOR DELAY=1 TO 300
460 NEXT DELAY
470 GOTO 390
480 PRINT TAB(4);"CORRECT"
490 FOR DELAY=1 TO 300
500 NEXT DELAY
510 NEXT J
520 CALL CLEAR
530 PRINT "DO YOU WANT TO TRY MORE{5 SPACES}PROBLE
    MS (Y OR N)?":::
540 CALL KEY(0,K,S)
550 IF S=0 THEN 540
560 IF (K=89)+(K=121)THEN 120
570 IF (K=78)+(K=110)THEN 590
580 GOTO 540
590 CALL CLEAR
600 END
610 REM ADDITION
620 PRINT TAB(8-LF);F
630 PRINT TAB(6-LG);"+";TAB(8-LG);G
640 PRINT TAB(3);"_____"
650 ANS=F+G
660 GOTO 410
670 REM SUBTRACTION
680 IF B<=C THEN 1000
690 IF F<G THEN 350
700 PRINT TAB(8-LF);F
710 PRINT TAB(6-LG);"-";TAB(8-LG);G
720 PRINT TAB(3);"_____"
730 ANS=F-G
740 GOTO 410
750 REM MULTIPLICATION
760 PRINT TAB(8-LF);F
770 PRINT TAB(6-LG);"x";TAB(8-LG);G
780 PRINT TAB(3);"_____"
790 ANS=F*G
800 GOTO 410
810 REM DIVISION
820 IF B<=C THEN 1000
830 IF G>F THEN 350
840 ON TT GOTO 850,880,920
```

Level 1 Games

```
850 IF INT(F/G)<(F/G)THEN 350
860 ANS=F/G
870 GOTO 930
880 ANS=INT(F/G)
890 R=(F/G)-ANS
900 R=INT(R*G+.00001)
910 GOTO 930
920 ANS=(INT(1000*F/G))/1000
930 PRINT TAB(8);"      "
940 PRINT TAB(6-LG);G;")";F:::
950 GOTO 410
960 PRINT "THE SECOND NUMBER MUST BE{3 SPACES}GREA
    TER THAN OR EQUAL TO{4 SPACES}THE FIRST. TRY A
    GAIN."
970 GOTO 250
980 PRINT "THE SECOND NUMBER MUST BE{3 SPACES}GREA
    TER THAN OR EQUAL TO{4 SPACES}THE FIRST. TRY A
    GAIN."
990 GOTO 290
1000 PRINT "THE SECOND NUMBER MUST BE{3 SPACES}LES
    S THAN THE FIRST.{8 SPACES}TRY AGAIN."
1010 GOTO 240
1020 PRINT : "WHICH TYPE OF DIVISION{6 SPACES}PROBL
    EM DO YOU WANT?": :
1030 PRINT "ALL ANSWERS ARE WHOLE{7 SPACES}NUMBERS
    (1)": :
1040 PRINT "ANSWERS WITH REMAINDERS (2)": :
1050 PRINT "ANSWERS WITH DECIMALS TO{4 SPACES}THRE
    E PLACES (3)"
1060 INPUT TT
1070 IF (TT>0)*(TT<4)THEN 1100
1080 PRINT "TRY AGAIN."
1090 GOTO 1060
1100 PRINT : "FOR DIVISION PROBLEMS, THE FIRST NU
    MBER IS THE DIVIDENDAND THE SECOND NUMBER IS
    {4 SPACES}THE DIVISOR.": :
1110 GOTO 240
1120 INPUT "REMAINDER  ":RR
1130 IF R<>RR THEN 440
1140 GOTO 430
```


Level 2 Games

Leaping Lizzie

Skill area: Coordination

Level: 2, 3

There is a row of platforms across the screen. Unfortunately, some of them are missing. Lizzie hops from one platform to another. Normally, she doesn't need any help from you, but when a platform or platforms are missing, you must make Lizzie leap over the openings. Otherwise, Lizzie falls to the bottom of the screen. If there is one platform missing, you must hit the 1 key just as Lizzie lands on the prior platform. If there are two consecutive platforms missing, you must hit the 2 key, and so on.

To cross the screen, Lizzie must land on all the platforms and avoid falling through any openings. If she gets completely across the screen without falling and without missing any platforms, you get 200 points. If Lizzie gets completely across the screen without falling, but having missed one platform, you get 100 points. You get no points if Lizzie gets across the screen but has missed two or more platforms. It is easy to see whether Lizzie has missed any platforms, because a platform disappears when she lands on it. Any platforms remaining at the end of a round were missed. Once the round is over, a new row of platforms appears and you must help get Lizzie across again.

With each round, the pace of the game speeds up slightly. Lizzie is permitted to fall twice, and the game is over after she falls the third time.

The speed of the game is controlled by two variables, DD and D, defined in lines 170 and 180, respectively. DD determines the speed of the initial round, and D determines how quickly the game speeds up. The higher DD is set initially, the slower the game. The higher D is set, the faster the pace of the game speeds up. If the game is playing too quickly, you can set DD equal to 150 instead of 100 in line 170, or if you want the game to play slowly for more rounds, set D equal to 5 instead of 10 in line 180.

Leaping Lizzie

```
100 REM LEAPING LIZZIE
110 REM
120 CALL CLEAR
```

Level 2 Games

```
130 RANDOMIZE
140 CALL CHAR(128,"18187E1818242424")
150 CALL CHAR(129,"7E7E181818181818")
160 CALL CHAR(130,"1818")
170 DD=100
180 D=10
190 MEN=3
200 CALL HCHAR(5,6,48,3)
210 CALL HCHAR(5,26,128,2)
220 CALL HCHAR(15,3,129,27)
230 CALL HCHAR(16,3,130,27)
240 FOR N=7 TO 27
250 X=RND
260 IF X<.6 THEN 280
270 CALL HCHAR(15,N,32)
280 NEXT N
290 C=3
300 CALL HCHAR(14,C,128)
310 FOR DELAY=1 TO DD
320 NEXT DELAY
330 CALL KEY(0,K,S)
340 FOR DELAY=1 TO DD
350 NEXT DELAY
360 IF (K>48)*(K<57)THEN 780
370 J=1
380 CALL VCHAR(14,C,32,2)
390 CALL SOUND(100,300,3)
400 C=C+J
410 IF C>29 THEN 550
420 CALL HCHAR(14,C,128)
430 CALL GCHAR(15,C,G)
440 IF G=129 THEN 310
450 CALL SOUND(1000,-3,3)
460 FOR N=14 TO 22
470 CALL HCHAR(N,C,32)
480 CALL HCHAR(N+1,C,128)
490 NEXT N
500 CALL HCHAR(23,C,32)
510 MEN=MEN-1
520 IF MEN=0 THEN 800
530 CALL HCHAR(5,28-MEN,32)
540 GOTO 220
550 SCORE=0
560 FOR N=3 TO 29
570 CALL GCHAR(15,N,G)
580 IF G<>129 THEN 600
590 SCORE=SCORE+1
600 NEXT N
610 IF SCORE>1 THEN 670
```

Level 2 Games

```
620 IF SCORE=1 THEN 700
630 SC=SC+2
640 IF SC>9 THEN 740
650 CALL HCHAR(5,6,SC+48)
660 IF DD<20 THEN 220
670 DD=DD-D
680 IF DD<60 THEN 720
690 GOTO 220
700 SC=SC+1
710 GOTO 640
720 D=5
730 GOTO 690
740 SC=SC-10
750 SC1=SC1+1
760 CALL HCHAR(5,5,SC1+48)
770 GOTO 650
780 J=K-47
790 GOTO 380
800 END
```

Maze Race

Skill area: Coordination

Level: 2, 3

This game is similar to the maze game except that it is a head-to-head race against the clock. The game starts by asking for each of the two players to enter a single character which will represent that player. This character can be any letter, any digit, or any other character on the keyboard. The program then asks how many laps the race should be. This can be any number from one to eight.

A double maze is displayed on the board. The two halves of the maze are identical. The character for player 1 is at the bottom of the left-hand maze, and the character for player 2 is at the bottom of the right-hand maze. As soon as the maze is displayed, the race begins. The first player controls his character with the E key (up), the S key (left), the X key (down), and the D key (right). The second player controls his character with the O key (up), the K key (left), the comma key (down), and the L key (right). A single lap is from the bottom of the screen to the top, or from the top to the bottom. To complete a lap, it is necessary to actually enter the opening in the top or bottom row. The race ends when one of the players completes the number of laps in the race.

This game is particularly good for elementary-school children, although older children enjoy it as well. The ALPHA LOCK key must be down for this game to play properly.

The program can be easily modified so that it can be played with joysticks. This is accomplished by substituting the following lines in the program:

```
500 CALL JOYST(1,X,Y)
520 IF (Y=4)*(R(N)>1)THEN 690
530 IF (X=-4)THEN 720
540 IF (X=4)THEN 750
550 IF (Y=-4)*(R(N)<23)THEN 780
610 CALL JOYST(2,X,Y)
620 IF (Y=4)*(R(N)>1)THEN 690
630 IF (X=-4)THEN 720
640 IF (X=4)THEN 750
650 IF (Y=-4)*(R(N)<23)THEN 780
```

Line 610 should be deleted when using joysticks.

As always, the ALPHA LOCK key must be up in order for this program to work properly with joysticks.

Maze Race

```
100 REM  MAZE RACE
110 REM
120 CALL CLEAR
130 RANDOMIZE
140 DIM A(2),R(2),C(2),OLDR(2),OLDC(2),L(2),UP(2)
150 FOR N=1 TO 2
160 PRINT "ENTER CHARACTER OF PLAYER";N:
170 INPUT A$
180 IF LEN(A$)=1 THEN 210
190 PRINT "TRY AGAIN."
200 GOTO 160
210 A(N)=ASC(A$)
220 PRINT
230 L(N)=0
240 NEXT N
250 INPUT "NUMBER OF LAPS (1 TO 9)? ":LAPS
260 IF LAPS>9 THEN 250
270 CALL CHAR(128,"FFFFFFFFFFFFFFFF")
280 CALL CLEAR
290 FOR N=1 TO 23 STEP 2
300 CALL HCHAR(N,3,128,28)
310 X=INT(RND*12+1)
320 CALL HCHAR(N,3+X,32)
330 CALL HCHAR(N,17+X,32)
340 NEXT N
350 CALL VCHAR(1,3,128,23)
360 CALL VCHAR(1,16,128,23)
370 CALL VCHAR(1,17,128,23)
380 CALL VCHAR(1,30,128,23)
390 C(1)=3+X
400 C(2)=17+X
410 FOR N=1 TO 2
420 R(N)=23
430 CALL HCHAR(R(N),C(N),A(N))
440 NEXT N
450 Z=INT(RND*2)+1
460 IF Z=2 THEN 580
470 N=1
480 OLDR(N)=R(N)
490 OLDC(N)=C(N)
500 CALL KEY(1,K,S)
510 K=K+1
520 IF (K=6)*(R(N)>1)THEN 690
530 IF K=3 THEN 720
```

Level 2 Games

```
540 IF K=4 THEN 750
550 IF (K=1)*(R(N)<23)THEN 780
560 GOTO 580
570 GOSUB 810
580 N=2
590 OLDR(N)=R(N)
600 OLDC(N)=C(N)
610 CALL KEY(2,K,S)
620 IF (K=6)*(R(N)>1)THEN 690
630 IF K=3 THEN 720
640 IF K=12 THEN 750
650 IF (K=14)*(R(N)<23)THEN 780
660 GOTO 470
670 GOSUB 810
680 GOTO 470
690 R(N)=R(N)-1
700 IF N=1 THEN 570
710 IF N=2 THEN 670
720 C(N)=C(N)-1
730 IF N=1 THEN 570
740 IF N=2 THEN 670
750 C(N)=C(N)+1
760 IF N=1 THEN 570
770 IF N=2 THEN 670
780 R(N)=R(N)+1
790 IF N=1 THEN 570
800 IF N=2 THEN 670
810 CALL GCHAR(R(N),C(N),G)
820 IF G=32 THEN 860
830 R(N)=OLDR(N)
840 C(N)=OLDC(N)
850 GOTO 900
860 CALL HCHAR(OLDR(N),OLDC(N),32)
870 CALL HCHAR(R(N),C(N),A(N))
880 CALL SOUND(50,300,3)
890 IF (R(N)=1)+(R(N)=23)THEN 910
900 RETURN
910 IF UP(N)=R(N)THEN 960
920 L(N)=L(N)+1
930 CALL HCHAR(24,11*N,L(N)+48)
940 IF L(N)=LAPS THEN 970
950 UP(N)=R(N)
960 RETURN
970 D=100
980 FOR N=1 TO 20
990 CALL SOUND(100,250+D,3)
1000 D=-D
1010 NEXT N
1020 CALL CLEAR
```

Level 2 Games

```
1030 PRINT "DO YOU WANT TO PLAY AGAIN?[11 SPACES](Y  
    OR N) ":::::::::  
1040 CALL KEY(0,K,S)  
1050 IF (K=78)+(K=110)THEN 1080  
1060 IF (K=89)+(K=121)THEN 280  
1070 GOTO 1040  
1080 END
```


Soccer Goalie

Skill area: Coordination**Level: 2, 3**

You have been drafted as the new goalie for your hometown soccer team. The team has not been doing very well, so everyone is depending on you to improve the team's standing in the league.

"Soccer Goalie" is a game for one or two players. The goalie's job is to catch soccer balls that are sent toward the goal on a random path. If there is only one player, the goal is the bottom of the screen, and the balls come from the top. The goalie is moved back and forth with the D and S keys. The computer displays the number of saves which the goalie has made and the number of goals scored against him.

If there are two players, the second player is at the top of the screen and blocks balls coming from the bottom of the screen. This player is moved with the J and K keys. The players alternate turns. The computer displays the number of saves and the number of goals scored against each player.

Soccer Goalie has two levels of difficulty. At level 1 the goalie has to be within only one column of the ball to make a save, while at level 2, the goalie has to be on exactly the correct column.

Soccer Goalie

```
100 REM  SOCCER GOALIE
110 REM
120 CALL CLEAR
130 RANDOMIZE
140 DIM ROW(2),COL(2),SAVES(2),GOALS(2)
150 INPUT "DIFFICULTY LEVEL (1 OR 2)?" : L
160 IF (L=1)+(L=2) THEN 190
170 PRINT : "TRY AGAIN" :
180 GOTO 150
190 INPUT "HOW MANY PLAYERS (1 OR 2)?" : N
200 IF N=1 THEN 270
210 IF N=2 THEN 240
220 PRINT : "TRY AGAIN." :
230 GOTO 190
240 PRINT : "PLAYER 1 IS ON THE BOTTOM{3 SPACES}AND
      USES THE S AND D KEYS." :
250 PRINT "PLAYER 2 IS ON THE TOP AND  USES THE J
      AND K KEYS." :
```

```

260 GOTO 280
270 PRINT : "USE THE S AND D KEYS TO{5 SPACES}MOVE
    GOALIE."::
280 PRINT "THE ALPHA LOCK KEY MUST BE DOWN.":: "HI
    T ANY KEY TO CONTINUE."
290 CALL KEY(0,K,S)
300 IF S=0 THEN 290
310 CALL CLEAR
320 CALL CHAR(100,"003C7E7E7E7E3C00")
330 CALL CHAR(101,"1818FFFF18242424")
340 ROW(1)=21
350 ROW(2)=3
360 COL(1)=15
370 COL(2)=15
380 IF N=1 THEN 410
390 PRINT TAB(3); "SAVES"; TAB(20); "GOALS":::::::::
    :::::::::::
400 CALL HCHAR(4,15,101)
410 PRINT TAB(3); "SAVES"; TAB(20); "GOALS"
420 CALL HCHAR(21,15,101)
430 FOR P=1 TO N
440 X=INT(RND*26+4)
450 Y=INT(RND*22+6)
460 D=(Y-X)/16
470 IF P=1 THEN 510
480 R=19
490 RD=-1
500 GOTO 530
510 R=5
520 RD=1
530 CALL HCHAR(R,X,32)
540 R=R+RD
550 X=X+D
560 IF R=ROW(P) THEN 680
570 CALL HCHAR(R,X,100)
580 CALL HCHAR(ROW(P),COL(P),32)
590 CALL KEY(P,K,S)
600 IF (K=2)*(COL(P)>5) THEN 630
610 IF (K=3)*(COL(P)<29) THEN 650
620 GOTO 660
630 COL(P)=COL(P)-1
640 GOTO 660
650 COL(P)=COL(P)+1
660 CALL HCHAR(ROW(P),COL(P),101)
670 GOTO 530
680 CALL GCHAR(R,X,G)
690 IF L=2 THEN 720
700 CALL GCHAR(R,X+1,GG)
710 CALL GCHAR(R,X-1,GGG)

```

Level 2 Games

```
720 IF (G=101)+(GG=101)+(GGG=101)THEN 810
730 CALL HCHAR(R,X,100)
740 CALL SOUND(100,-3,3)
750 FOR DELAY=1 TO 100
760 NEXT DELAY
770 GOALS(P)=GOALS(P)+1
780 CALL HCHAR(R,X,32)
790 GOSUB 870
800 GOTO 850
810 SAVES(P)=SAVES(P)+1
820 CALL SOUND(50,300,3)
830 GOSUB 870
840 GOTO 850
850 NEXT P
860 GOTO 430
870 T$=STR$(SAVES(P))
880 IF (SAVES(P)>99)+(GOALS(P)>99)THEN 970
890 CALL HCHAR(ROW(P)+2*RD,11,ASC(SEG$(T$,1,1)))
900 IF LEN(T$)=1 THEN 920
910 CALL HCHAR(ROW(P)+2*RD,12,ASC(SEG$(T$,2,1)))
920 T$=STR$(GOALS(P))
930 CALL HCHAR(ROW(P)+2*RD,28,ASC(SEG$(T$,1,1)))
940 IF LEN(T$)=1 THEN 960
950 CALL HCHAR(ROW(P)+2*RD,29,ASC(SEG$(T$,2,1)))
960 RETURN
970 M$="GAME OVER"
980 FOR Z=1 TO 9
990 CALL HCHAR(12,10+Z,ASC(SEG$(M$,Z,1)))
1000 NEXT Z
1010 FOR DELAY=1 TO 1000
1020 NEXT DELAY
1030 END
```

Dicey

Skill area: Strategy
Level: 2, 3

To play "Dicey," you must be able to do simple addition. The game involves throwing two dice. There are two players. When it is your turn, you can throw the dice as many times as you wish until one of two things happens: Either you voluntarily stop, or you throw doubles (both dice the same). If you stop voluntarily, your score for that turn is the total of all of your rolls on that turn. If you throw doubles, your score on that turn is zero. Each player has a total of six turns. The strategy comes in trying to decide when to stop rolling and accept your present score for that turn. It's always tempting to throw just one more time, but there is the risk that you will throw doubles and lose everything.

Let's say Jason and Jessica are the two players. Jason goes first, and on his first roll he gets a 3 and 2. He chooses to roll again, and he gets a 6 and 5. He chooses to roll again, and he gets a 5 and 1. Now he chooses to stop, so his score for that round is 22, which is the total of all of his rolls. Jessica then takes her turn. She rolls a 4 and 2 on the first round, a 6 and 1 on the second roll, and a 3 and 3 on the third roll. Since this is doubles, her score for this round is zero. The score at the end of the first round is 22 for Jason and 0 for Jessica.

On the second round, Jason rolls a 5 and 3 on the first roll, and two 6's on the second roll. He scores nothing for this round, but he still has his 22 from the first round. Jessica rolls a 6 and 5 on the first roll of her turn, a 3 and 2 on the second roll of her turn, 6 and 1 on the third roll of her turn, a 4 and 1 on the fourth roll of her turn, and a 1 and 3 on the fifth roll of her turn. She chooses to stop rather than roll again on that turn, so her score for the second round is 32. At the end of two rounds, the score is 22 for Jason and 32 for Jessica.

There are a total of six rounds in a game, and the player with the higher score at the end of the six rounds is the winner.

This game can be played either by two players, with the computer simply keeping track of each player's score and rolling the dice, or one player can play against the computer. The program first asks for the number of players. If 1 is entered, then it is

Level 2 Games

assumed that the one player is playing against the computer. If 2 is entered, then it is assumed that two players are playing against each other. The names of the one or two players are then entered, and then the computer asks who goes first. At this time, type in either a player's name or the word COMPUTER. If there are two people playing, typing in the word COMPUTER would get an error message.

The display for each round will show the round number, whose turn it is, each player's score prior to that round, and the score for this round. After each roll, the computer asks you whether you want to roll again. When it's the computer's turn, all you do is watch, since the computer's playing strategy is built into the program.

Dicey

```
100 REM DICEY
110 REM
120 CALL CLEAR
130 DIM A$(9), B(9), NAME$(2), SCORE(2)
140 RANDOMIZE
150 ROUND=1
160 CALL CHAR(42,"0")
170 CALL CHAR(43,"0000001818")
180 NAME$(2)="COMPUTER"
190 INPUT "NUMBER OF PLAYERS(1 OR 2)":P
200 IF (P=1)+(P=2)THEN 230
210 PRINT "ONLY 1 OR 2 CAN PLAY. TRY{3 SPACES}AGAI
N."
220 GOTO 190
230 FOR N=1 TO P
240 PRINT "NAME OF PLAYER";I;
250 INPUT NAME$(N)
260 NEXT N
270 PRINT "WHO GOES FIRST, ";NAME$(1);" OR ";NAME$
(2)
280 INPUT C$
290 IF C$=NAME$(1)THEN 330
300 IF C$=NAME$(2)THEN 840
310 PRINT "TRY AGAIN."
320 GOTO 280
330 T=1
340 CALL CLEAR
350 CALL COLOR(2,2,16)
360 PRINT "ROUND";INT(ROUND/2+.5):::
370 PRINT NAME$(T);"'S TURN"::
380 PRINT NAME$(1);"'S SCORE IS";SCORE(1)
390 PRINT NAME$(2);"'S SCORE IS";SCORE(2)
```

Level 2 Games

```
400 PRINT "SCORE FOR THIS ROUND":  
410 CALL HCHAR(23,4,32,20)  
420 X=INT(RND*6+1)  
430 Y=INT(RND*6+1)  
440 FOR N=3 TO 5  
450 CALL HCHAR(N,8,32,10)  
460 NEXT N  
470 ON X GOSUB 1020,1040,1060,1080,1100,1120  
480 COL=8  
490 GOSUB 1140  
500 ON Y GOSUB 1020,1040,1060,1080,1100,1120  
510 COL=12  
520 GOSUB 1140  
530 IF X=Y THEN 700  
540 SUM=SUM+X+Y  
550 D1=D1+X+Y  
560 IF D1>9 THEN 1280  
570 CALL HCHAR(21,26,D1+48)  
580 IF NAME$(T)="COMPUTER" THEN 860  
590 M$="AGAIN Y OR N ?"  
600 FOR M=1 TO LEN(M$)  
610 S$=SEG$(M$,M,1)  
620 CALL HCHAR(23,3+M,ASC(S$))  
630 NEXT M  
640 CALL KEY(0,K,S)  
650 IF K=78 THEN 680  
660 IF K=89 THEN 410  
670 GOTO 640  
680 SCORE(T)=SCORE(T)+SUM  
690 GOTO 710  
700 CALL SOUND(500,-3,3)  
710 T=T+1  
720 IF T=3 THEN 820  
730 ROUND=ROUND+1  
740 FOR DELAY=1 TO 300  
750 NEXT DELAY  
760 IF ROUND=13 THEN 1410  
770 SUM=0  
780 D1=0  
790 D2=0  
800 D3=0  
810 GOTO 340  
820 T=1  
830 GOTO 730  
840 T=2  
850 GOTO 340  
860 FOR DELAY=1 TO 600  
870 NEXT DELAY  
880 DIFF=SCORE(1)-SCORE(2)
```

Level 2 Games

```
890 IF ROUND/2=INT(ROUND/2)THEN 920
900 TARGET=DIFF+28
910 GOTO 940
920 TARGET=DIFF+1
930 IF ROUND=12 THEN 960
940 IF TARGET<28 THEN 980
950 IF TARGET>40 THEN 1000
960 IF SUM>TARGET THEN 680
970 GOTO 410
980 TARGET=28
990 GOTO 960
1000 TARGET=40
1010 GOTO 960
1020 C$="*****+*****"
1030 RETURN
1040 C$="**+***+**"
1050 RETURN
1060 C$="+***+***+"
1070 RETURN
1080 C$="+*+***+*+"
1090 RETURN
1100 C$="+*+*+*+*+"
1110 RETURN
1120 C$="+*+*+*+*+"
1130 RETURN
1140 FOR N=1 TO 9
1150 A$(N)=SEG$(C$,N,1)
1160 B(N)=ASC(A$(N))
1170 NEXT N
1180 CALL HCHAR(3,COL,B(1))
1190 CALL HCHAR(3,COL+1,B(2))
1200 CALL HCHAR(3,COL+2,B(3))
1210 CALL HCHAR(4,COL,B(4))
1220 CALL HCHAR(4,COL+1,B(5))
1230 CALL HCHAR(4,COL+2,B(6))
1240 CALL HCHAR(5,COL,B(7))
1250 CALL HCHAR(5,COL+1,B(8))
1260 CALL HCHAR(5,COL+2,B(9))
1270 RETURN
1280 D1=D1-10
1290 IF D1>9 THEN 1380
1300 D2=D2+1
1310 IF D2>9 THEN 1340
1320 CALL HCHAR(21,25,D2+48)
1330 GOTO 570
1340 D2=0
1350 D3=D3+1
1360 CALL HCHAR(21,24,D3+48)
1370 GOTO 1320
```

Level 2 Games

```
1380 D1=D1-10
1390 D2=D2+1
1400 GOTO 1300
1410 CALL CLEAR
1420 PRINT "THE GAME IS OVER"
1430 PRINT NAME$(1); "'S SCORE WAS";SCORE(1)
1440 PRINT NAME$(2); "'S SCORE WAS";SCORE(2)
1450 PRINT :::::::
1460 END
```


Copy Cat

Skill area: Memory

Level: 2, 3

Up to four people can play "Copy Cat," which involves remembering and copying a progressively longer chain of colors. On each player's turn, the computer produces a chain of colors, which it displays by changing the color of the screen. It starts by showing the first color. You have to copy that by hitting the appropriate key. There are four possible colors: green, blue, red and yellow. The 1 key produces green; 2 produces blue; 3 produces red; and 4 produces yellow. Whenever a color is shown, there is a sound associated with it, ranging from a very low-pitched tone for green to a very high-pitched tone for yellow.

Suppose it is Naomi's turn. The computer changes the color for the screen from its normal white to blue for a moment, plays the tone associated with blue, and prints the number 2 in the center of the screen. Naomi then has to hit the key corresponding to the color, in this case the 2 key. If she is correct, the computer extends the chain by one. First it would flash blue, then it would flash a second color, like red or even blue again. Naomi must now hit the 2 key, then the 3 key. As she hits each key, the color of the screen changes for a moment and the appropriate tone sounds. If she is correct, the computer again adds a color to the chain. Suppose that this time it flashes blue, red, then red again. Naomi must now hit the 2 key, the 3 key, then the 3 key again.

Obviously, remembering the chain is easy for most people when it is only three or four colors long, but it starts getting much more difficult as the chain gets longer. Eventually you make a mistake, and that ends your turn. Your score for a turn is the length of the chain at the time the turn ended.

The computer keeps track of each player's score and displays totals at the end of each round.

Copy Cat

```
100 REM COPY CAT
110 REM
120 CALL CLEAR
130 RANDOMIZE
```

Level 2 Games

```
140 DIM A(40),NAME$(4),SCORE(4)
150 PRINT TAB(5);"1 GREEN":
160 PRINT TAB(5);"2 BLUE":
170 PRINT TAB(5);"3 RED":
180 PRINT TAB(5);"4 YELLOW":
190 PRINT "HIT ANY KEY TO START.":
200 CALL KEY(0,K,S)
210 X=RND
220 IF S=0 THEN 200
230 CALL CLEAR
240 INPUT "NUMBER OF PLAYERS ":P
250 IF (P>0)*(P<5)THEN 280
260 PRINT ::"TRY AGAIN":
270 GOTO 240
280 FOR J=1 TO P
290 PRINT ::"NAME OF PLAYER";J
300 INPUT NAME$(J)
310 PRINT ::
320 NEXT J
330 FOR J=1 TO P
340 PRINT NAME$(J);"S TURN":
350 PRINT "HIT ANY KEY TO START.":
360 CALL KEY(0,K,S)
370 X=RND
380 IF S=0 THEN 360
390 CALL CLEAR
400 N=1
410 CALL SCREEN(16)
420 FOR DELAY=1 TO 200
430 NEXT DELAY
440 A(N)=INT(RND*4+1)
450 FOR M=1 TO N
460 CALL SCREEN(3*A(M))
470 L=A(M)+48
480 CALL HCHAR(10,16,L)
490 CALL SOUND(400,60*2^(A(M)),2)
500 FOR DELAY=1 TO 200
510 NEXT DELAY
520 NEXT M
530 CALL HCHAR(10,16,32)
540 CALL SCREEN(16)
550 FOR DELAY=1 TO 50
560 NEXT DELAY
570 FOR M=1 TO N
580 CALL KEY(0,K,S)
590 IF S=0 THEN 580
600 IF (K-48)<>A(M)THEN 710
610 CALL SCREEN(3*A(M))
620 CALL SOUND(400,60*2^(A(M)),2)
```

Level 2 Games

```
630 FOR DELAY=1 TO 200
640 NEXT DELAY
650 NEXT M
660 CALL SCREEN(16)
670 FOR DELAY=1 TO 200
680 NEXT DELAY
690 N=N+1
700 GOTO 440
710 CALL SOUND(700,-3,2)
720 CALL SCREEN(16)
730 SCORE(J)=SCORE(J)+N
740 PRINT NAME$(J);"'S SCORE"
750 PRINT "THIS TURN ";N
760 PRINT "TOTAL ";SCORE(J):;;;
770 FOR DELAY=1 TO 300
780 NEXT DELAY
790 NEXT J
800 PRINT "DO YOU WANT TO PLAY ANOTHER ROUND (Y OR
    N)?:;;;
810 CALL KEY(0,K,S)
820 IF K=89 THEN 330
830 IF K=78 THEN 850
840 GOTO 810
850 CALL CLEAR
860 FOR J=1 TO P
870 PRINT NAME$(J);"'S SCORE WAS";SCORE(J):;;
880 NEXT J
890 END
```

Crossout

Skill area: Strategy**Level: 2, 3**

"Crossout" is a variation of an old game played with match sticks. A number of lines are displayed on the screen, and the two players (in this case, you and the computer) take turns crossing out lines. On any turn, you can cross out one, two, or three lines. The player who crosses out the last line loses.

The game starts by asking how many sticks should be in the game. This can be any number between 21 and 28. Then you must decide who will take the first turn, you or the computer. If the computer plays first, the words COMPUTER'S TURN will be displayed, and then either 1, 2, or 3 lines will be crossed out. Then the words YOUR TURN will be displayed. You must enter either a 1, 2, or 3 indicating the number of lines you wish to cross out. That number of lines will be crossed out, and then it is the computer's turn again. The player who crosses out the last line loses the game.

The remarkable thing about Crossout is that the computer will almost always win regardless of whether it plays first or second.

This is an interesting strategy game for children ages eight or older. Of course, there is a strategy for winning. Try to figure it out.

Crossout

```
100 REM CROSSOUT
110 REM
120 RANDOMIZE
130 CALL CHAR(128,"01010101010101")
140 CALL CHAR(129,"8080808080808080")
150 CALL CHAR(130,"01016131190D0703")
160 CALL CHAR(131,"80C0E0B0988C8680")
170 CALL CLEAR
180 PRINT "HOW MANY STICKS DO YOU WANT TO PLAY WITH (21-28)?"
190 INPUT STICKS
200 IF (STICKS>20)*(STICKS<29)THEN 230
210 PRINT "TRY AGAIN":
220 GOTO 190
230 PRINT "IF YOU WANT TO START ENTER"
240 PRINT "1, IF YOU WANT COMPUTER TO"
```

Level 2 Games

```
250 PRINT "START, ENTER 2"
260 INPUT START
270 IF (START=1)+(START=2)THEN 300
280 PRINT : "TRY AGAIN"
290 GOTO 260
300 CALL CLEAR
310 FOR K=5 TO 13 STEP 4
320 FOR J=6 TO 24 STEP 3
330 CALL VCHAR(K,J,128,2)
340 CALL VCHAR(K,J+1,129,2)
350 NEXT J
360 NEXT K
370 IF STICKS=21 THEN 420
380 FOR J=1 TO STICKS-21
390 CALL VCHAR(17,3+3*J,128,2)
400 CALL VCHAR(17,4+3*J,129,2)
410 NEXT J
420 J=6
430 K=5
440 COUNT=STICKS
450 IF START=2 THEN 600
460 M$="YOUR TURN"
470 GOSUB 1010
480 CALL KEY(0,L,S)
490 IF (L=49)+(L=50)+(L=51)THEN 510
500 GOTO 480
510 CALL HCHAR(21,5,32,12)
520 FOR M=1 TO L-48
530 CALL HCHAR(K,J,130)
540 CALL HCHAR(K+1,J+1,131)
550 COUNT=COUNT-1
560 IF COUNT=0 THEN 930
570 J=J+3
580 IF J>24 THEN 870
590 NEXT M
600 M$="COMPUTER'S TURN"
610 GOSUB 1010
620 FOR I=1 TO 300
630 NEXT I
640 IF COUNT>20 THEN 1060
650 ON COUNT GOTO 820,760,780,800,760,760,780,800,
    760,760,780,800,1060,760,780,800,1060,760,780,
    800
660 CALL HCHAR(21,5,12,32)
670 FOR M=1 TO L
680 CALL HCHAR(K,J,130)
690 CALL HCHAR(K+1,J+1,131)
700 COUNT=COUNT-1
710 IF COUNT=0 THEN 820
```

Level 2 Games

```
720 J=J+3
730 IF J>24 THEN 900
740 NEXT M
750 GOTO 460
760 L=1
770 GOTO 660
780 L=2
790 GOTO 660
800 L=3
810 GOTO 660
820 PRINT "YOU WIN"
830 FOR F=1 TO 9
840 CALL SOUND(50,120+100*F,3)
850 NEXT F
860 GOTO 940
870 J=6
880 K=K+4
890 GOTO 590
900 J=6
910 K=K+4
920 GOTO 740
930 PRINT "YOU LOSE"
940 PRINT "DO YOU WANT TO PLAY AGAIN"
950 PRINT "{3 SPACES}(Y OR N)"
960 CALL KEY(0,L,S)
970 IF (L=89)+(L=121)THEN 170
980 IF (L=78)+(L=110)THEN 1000
990 GOTO 960
1000 END
1010 FOR X=1 TO LEN(M$)
1020 S$=SEG$(M$,X,1)
1030 CALL HCHAR(21,4+X,ASC(S$))
1040 NEXT X
1050 RETURN
1060 L=INT(RND*3+1)
1070 GOTO 660
```

Acie Deucie

Skill area: Mathematics**Level: 2, 3**

"Acie Deucie" is a simple card game that teaches the concepts of chance and probability. Two cards are turned over, and you have to bet whether a third card will be between these two or not. As in most card games, aces are the highest cards and deuces are the lowest.

In this version, the computer asks how many players there are and then asks for the name of each player. Each player starts with a stake of \$200. On each round, you must bet from \$10 to \$50. The computer shows whose turn it is, then reveals the two cards. After you bet, the third card is revealed. If the third card lies between the first two, you win the amount of the bet. If the card is not between the first two cards, you lose the bet. If the third card is the same as one of the first two cards, you lose.

If your stake is below \$10, you're out of the game. The game continues as long as there are at least two players left.

This game involves a good deal of strategy. Even though most players will lose most of their bets, they should be able to increase their stake by wisely betting large amounts on situations where they are more likely to win, and small bets in situations where they are more likely to lose.

The game is played with a regular 52 card deck, so players can keep track of the cards that have been played, and improve their betting strategy. When the program prints SHUFFLING, it means that it is starting over with a new deck.

Acie Deucie

```
100 REM ACIE-DEUCIE
110 REM
120 RANDOMIZE
130 CALL CLEAR
140 DIM NAME$(4), STAKE(4), CARD(13), X(3)
150 INPUT "HOW MANY PLAYERS (1 TO 4)?: " P
160 IF (P>0)*(P<5) THEN 190
170 PRINT : "TRY AGAIN":
180 GOTO 150
190 FOR N=1 TO P
```

Level 2 Games

```
200 PRINT "NAME OF PLAYER";N
210 INPUT NAME$(N)
220 STAKE(N)=200
230 PRINT ::
240 NEXT N
250 PLAYER=1
260 CALL CLEAR
270 PRINT TAB(4);NAME$(PLAYER);"'S TURN"::::
280 N=1
290 COL=10
300 GOSUB 740
310 N=2
320 COL=21
330 GOSUB 740
340 INPUT "ENTER BET ($10-$50) $":B
350 B=INT(B)
360 IF (B>9)*(B<51)THEN 390
370 PRINT "TRY AGAIN."
380 GOTO 340
390 IF B>STAKE(PLAYER)THEN 370
400 N=3
410 COL=15
420 GOSUB 740
430 IF (X(3)>X(1))*(X(3)<X(2))THEN 610
440 IF (X(3)>X(2))*(X(3)<X(1))THEN 610
450 STAKE(PLAYER)=STAKE(PLAYER)-B
460 CALL SOUND(500,-3,3)
470 IF STAKE(PLAYER)<=10 THEN 960
480 FOR DELAY=1 TO 600
490 NEXT DELAY
500 CALL CLEAR
510 FOR M=1 TO P
520 PRINT NAME$(M);"'S STAKE IS $";STAKE(M)::
530 NEXT M
540 PRINT "HIT ANY KEY TO CONTINUE."
550 CALL KEY(0,K,S)
560 IF S=0 THEN 550
570 IF Z>44 THEN 660
580 PLAYER=PLAYER+1
590 IF PLAYER=P+1 THEN 250
600 GOTO 260
610 STAKE(PLAYER)=STAKE(PLAYER)+B
620 FOR T=1 TO 10
630 CALL SOUND(50,50+100*T,3)
640 NEXT T
650 GOTO 480
660 Z=0
670 PRINT "SHUFFLING"
680 FOR DELAY=1 TO 300
```

Level 2 Games

```
690 NEXT DELAY
700 FOR J=1 TO 13
710 CARD(J)=0
720 NEXT J
730 GOTO 580
740 X(N)=INT(RND*13+1)
750 IF CARD(X(N))=4 THEN 740
760 CARD(X(N))=CARD(X(N))+1
770 Z=Z+1
780 VV=32
790 ON X(N)GOSUB 850,850,850,850,850,850,850,850,8
    70,900,920,940,830
800 CALL HCHAR(10,COL,V)
810 CALL HCHAR(10,COL+1,VV)
820 RETURN
830 V=65
840 RETURN
850 V=49+X(N)
860 RETURN
870 V=49
880 VV=48
890 RETURN
900 V=74
910 RETURN
920 V=81
930 RETURN
940 V=75
950 RETURN
960 CALL CLEAR
970 PRINT NAME$(PLAYER);" IS OUT OF THE GAME.":::
980 FOR DELAY=1 TO 300
990 NEXT DELAY
1000 IF PLAYER=P THEN 1050
1010 FOR W=PLAYER TO P-1
1020 NAME$(W)=NAME$(W+1)
1030 STAKE(W)=STAKE(W+1)
1040 NEXT W
1050 P=P-1
1060 IF P=1 THEN 1080
1070 GOTO 250
1080 PRINT "THE WINNER IS ";NAME$(1):::
1090 END
```

Fox and Geese

Skill area: Strategy**Level: 2, 3**

"Fox and Geese" is a strategy game only slightly less complex than checkers. It is played on a checkerboard. Like checkers, all the play is on the light squares and all moves are on the diagonal. One player is the fox. The fox starts on one of the two center squares at one end of the board and moves one square at a time, either forward or backward. The other players are the geese. There are four geese, and these start on the four squares at the other end of the board. They can move one square at a time, but only forward. The geese move first, and then players alternate. There is no jumping or capturing.

The geese are to bottle up the fox so he cannot move, and the fox is to break through the line of geese. Once the fox has broken through the line of geese, they can never trap him since they can't move backwards.

A checkerboard is drawn on the screen, with a fox on a white square at the top of the screen, and four geese in the four white squares in the bottom row of the screen. Each square can be identified by a letter-number combination. The eight rows are designated by the letters A through H, and the eight columns by the numbers 1 through 8.

In this program, you can choose to play either the fox or the geese, and the computer will play the other. The strategy for both the fox and the geese is built into the program. If you are playing the geese, the word FROM will appear at the bottom of the screen when it is your turn, indicating that you must type in the coordinates of the square that the goose will be moving from. These coordinates must be typed in the form letter-number; for example H 3. Then the word TO appears, and you enter the coordinates of the square that you wish to move the goose to, again in the form letter-number. If the move is a legal move, the goose will be moved. If the move which was entered is illegal for any reason, the computer will make a warning sound and will then give you an opportunity to try again. The fox will then make his move according to the strategy programmed in. You then enter the next move for the geese and so on, until one side or the other has won.

Level 2 Games

When you are playing the fox, the geese move first. Then you indicate where you want the fox to move. Since there is only one fox, there is no need to enter the coordinates of the square the fox is moving from, only the coordinates of the square that the fox is moving to. Again, these must be entered in the form letter-number. If the move is legal, the fox will be moved, and the geese will then take their turn.

The strategies for the two sides were developed by programming in a few simple rules and then playing numerous games to identify situations where the computer seemed to be making an inferior move. In such cases, a line was added to the program telling the computer how to move in such a situation. After you play a number of games, you may encounter similar situations where the computer seems to be making a poor move. If you wish, you can then add lines to the program to improve the strategy of the computer.

Fox and Geese

```
100 REM  FOX AND GEESE
110 REM
120 CALL CLEAR
130 INPUT "DO YOU WANT TO PLAY THE FOX OR THE GEES
    E (F OR G)?:Q$
140 IF (Q$="F")+(Q$="G")THEN 170
150 PRINT "TRY AGAIN."
160 GOTO 130
170 CALL CLEAR
180 CALL COLOR(9,16,16)
190 DIM V(27)
200 CALL CHAR(120,"FFFFFFFFFFFFFFFF")
210 CALL CHAR(104,"0000387C1C0C0C0E")
220 CALL CHAR(105,"0000000000000006")
230 CALL CHAR(106,"1F1F0F0703010300")
240 CALL CHAR(107,"FEFCF8F0E0406000")
250 CALL CHAR(112,"000000000010387C")
260 CALL CHAR(113,"0000000E0E060606")
270 CALL CHAR(114,"7F0F0F0F0C0A0900")
280 CALL CHAR(115,"FEFEFEFE060A1200")
290 FOR N=5 TO 17 STEP 4
300 FOR P=8 TO 20 STEP 4
310 CALL HCHAR(N,P,120,2)
320 CALL HCHAR(N+1,P,120,2)
330 CALL HCHAR(N+2,P+2,120,2)
340 CALL HCHAR(N+3,P+2,120,2)
350 CALL HCHAR(N,P+2,96,2)
360 CALL HCHAR(N+1,P+2,96,2)
```

Level 2 Games

```
370 CALL HCHAR(N+2,P,96,2)
380 CALL HCHAR(N+3,P,96,2)
390 NEXT P
400 NEXT N
410 FOR N=1 TO 8
420 CALL HCHAR(3+2*N,7,64+N)
430 CALL HCHAR(4,6+2*N,48+N)
440 NEXT N
450 CALL COLOR(13,1,1)
460 CALL COLOR(10,2,16)
470 CALL COLOR(11,2,16)
480 CALL HCHAR(21,8,128,16)
490 R=5
500 C=14
510 J=112
520 GOSUB 1690
530 R=19
540 J=104
550 FOR C=8 TO 20 STEP 4
560 GOSUB 1690
570 NEXT C
580 IF Q$="G" THEN 2350
590 KROW=5
600 KCOL=14
610 REM LOOP BEGINS
620 S$=""
630 A=19
640 B=8
650 CALL GCHAR(A,B,G)
660 G$=CHR$(G/8+36)
670 S$=S$&G$
680 B=B+4
690 IF B=24 THEN 720
700 IF B=26 THEN 750
710 GOTO 650
720 B=10
730 A=A-2
740 IF A>4 THEN 650
750 B=8
760 A=A-2
770 IF A>4 THEN 650
780 Z=0
790 IF SEG$(S$,1,8)="00000000" THEN 1650
800 IF SEG$(S$,1,8)="11112000" THEN 1900
810 IF SEG$(S$,1,8)="01111200" THEN 1900
820 IF SEG$(S$,1,8)="00111120" THEN 1940
830 IF (SEG$(S$,1,8)="00001111")*(SEG$(S$,12,1)="0
")THEN 1980
840 IF SEG$(S$,1,12)="000011100021" THEN 1940
```

Level 2 Games

```
850 IF SEG$(S$,1,14)="00000100011100" THEN 2060
860 IF SEG$(S$,1,12)="000010000111" THEN 2140
870 IF SEG$(S$,1,14)="00010110010002" THEN 2020
880 IF SEG$(S$,1,18)="000101000110000002" THEN 206
0
890 IF SEG$(S$,1,14)="00010100001012" THEN 2100
900 IF SEG$(S$,1,12)="000010002111" THEN 2060
910 IF SEG$(S$,1,8)="00010112" THEN 2180
920 IF SEG$(S$,1,14)="00100110010002" THEN 2020
930 IF SEG$(S$,1,15)="001001100100002" THEN 2180
940 IF SEG$(S$,1,11)="00000110011" THEN 2180
950 IF SEG$(S$,1,18)="001001000110000002" THEN 206
0
960 IF SEG$(S$,1,14)="00100100001012" THEN 2100
970 IF SEG$(S$,1,16)="0000011101000000" THEN 2020
980 IF SEG$(S$,1,11)="00000111010" THEN 2220
990 IF SEG$(S$,1,15)="000010100110002" THEN 2180
1000 IF SEG$(S$,1,12)="000000110110" THEN 1980
1010 IF SEG$(S$,1,11)="00101110002" THEN 1940
1020 IF (SEG$(S$,1,1)="1")*(SEG$(S$,5,1)="0")THEN
1740
1030 IF (SEG$(S$,2,1)="1")*(SEG$(S$,6,1)="0")THEN
1780
1040 IF (SEG$(S$,3,1)="1")*(SEG$(S$,7,1)="0")THEN
1820
1050 IF (SEG$(S$,4,1)="1")*(SEG$(S$,8,1)="0")THEN
1860
1060 IF (SEG$(S$,8,1)="1")*(SEG$(S$,12,1)="0")THEN
1980
1070 IF (SEG$(S$,7,1)="1")*(SEG$(S$,11,1)="0")THEN
2020
1080 IF (SEG$(S$,6,1)="1")*(SEG$(S$,10,1)="0")THEN
2100
1090 IF (SEG$(S$,5,1)="1")*(SEG$(S$,9,1)="0")THEN
2140
1100 IF (SEG$(S$,7,1)="1")*(SEG$(S$,12,1)="0")THEN
2180
1110 CALL SOUND(700,700,3)
1120 PRINT "THE FOX WINS"
1130 GOTO 3790
1140 CALL SOUND(100,300,3)
1150 CALL GCHAR(KROW-2,KCOL-2,G)
1160 IF G=96 THEN 1240
1170 CALL GCHAR(KROW-2,KCOL+2,G)
1180 IF G=96 THEN 1240
1190 CALL GCHAR(KROW+2,KCOL-2,G)
1200 IF G=96 THEN 1240
1210 CALL GCHAR(KROW+2,KCOL+2,G)
1220 IF G=96 THEN 1240
```

Level 2 Games

```
1230 GOTO 2330
1240 CALL HCHAR(23,5,32,20)
1250 CALL KEY(0,K,S)
1260 IF (K>64)*(K<73)THEN 1280
1270 GOTO 1250
1280 CALL HCHAR(23,5,K)
1290 CALL SOUND(100,300,3)
1300 CALL KEY(0,KK,S)
1310 IF (KK>48)*(KK<57)THEN 1330
1320 GOTO 1300
1330 CALL HCHAR(23,7,KK)
1340 CALL SOUND(100,300,3)
1350 KROW=K*2-125
1360 KCOL=KK*2-90
1370 CALL GCHAR(KROW,KCOL,G)
1380 IF G=96 THEN 1420
1390 CALL SOUND(500,-3,3)
1400 CALL HCHAR(23,5,32,5)
1410 GOTO 1250
1420 OLDROW=KROW-2
1430 OLDCOL=KCOL-2
1440 CALL GCHAR(OLDROW,OLDCOL,G)
1450 IF G=112 THEN 1560
1460 OLDCOL=KCOL+2
1470 CALL GCHAR(OLDROW,OLDCOL,G)
1480 IF G=112 THEN 1560
1490 OLDROW=KROW+2
1500 CALL GCHAR(OLDROW,OLDCOL,G)
1510 IF G=112 THEN 1560
1520 OLDCOL=KCOL-2
1530 CALL GCHAR(OLDROW,OLDCOL,G)
1540 IF G=112 THEN 1560
1550 GOTO 1390
1560 R=OLDROW
1570 C=OLDCOL
1580 J=96
1590 GOSUB 1690
1600 R=KROW
1610 C=KCOL
1620 J=112
1630 GOSUB 1690
1640 GOTO 610
1650 S$=SEG$(S$,9,24)
1660 Z=Z+1
1670 IF Z=3 THEN 2330
1680 GOTO 790
1690 CALL HCHAR(R,C,J)
1700 CALL HCHAR(R,C+1,J+1)
1710 CALL HCHAR(R+1,C,J+2)
```

Level 2 Games

```
1720 CALL HCHAR(R+1,C+1,J+3)
1730 RETURN
1740 R=19
1750 C=8
1760 CC=10
1770 GOTO 2250
1780 R=19
1790 C=12
1800 CC=14
1810 GOTO 2250
1820 R=19
1830 C=16
1840 CC=18
1850 GOTO 2250
1860 R=19
1870 C=20
1880 CC=22
1890 GOTO 2250
1900 R=19
1910 C=20
1920 CC=18
1930 GOTO 2250
1940 R=17
1950 C=10
1960 CC=12
1970 GOTO 2250
1980 R=17
1990 C=22
2000 CC=20
2010 GOTO 2250
2020 R=17
2030 C=18
2040 CC=16
2050 GOTO 2250
2060 R=15
2070 C=12
2080 CC=10
2090 GOTO 2250
2100 R=17
2110 C=14
2120 CC=12
2130 GOTO 2250
2140 R=17
2150 C=10
2160 CC=8
2170 GOTO 2250
2180 R=17
2190 C=18
2200 CC=20
```

Level 2 Games

```
2210 GOTO 2250
2220 R=17
2230 C=14
2240 CC=16
2250 R=R-4*Z
2260 J=96
2270 GOSUB 1690
2280 R=R-2
2290 C=CC
2300 J=104
2310 GOSUB 1690
2320 GOTO 1140
2330 PRINT "GEESE WIN"
2340 GOTO 3790
2350 REM LOOP BEGINS
2360 FOXROW=5
2370 FOXCOL=14
2380 CALL HCHAR(23,5,70)
2390 CALL HCHAR(23,6,82)
2400 CALL HCHAR(23,7,79)
2410 CALL HCHAR(23,8,77)
2420 CALL KEY(0,R,S)
2430 IF (R>64)*(R<73) THEN 2450
2440 GOTO 2420
2450 CALL SOUND(50,300,3)
2460 CALL HCHAR(23,10,R)
2470 CALL KEY(0,C,S)
2480 IF (C>48)*(C<57) THEN 2500
2490 GOTO 2470
2500 CALL SOUND(50,300,3)
2510 CALL HCHAR(23,12,C)
2520 R=2*R-125
2530 C=2*C-90
2540 CALL GCHAR(R,C,G)
2550 IF G=104 THEN 2590
2560 CALL SOUND(500,-3,3)
2570 CALL HCHAR(23,5,32,20)
2580 GOTO 2380
2590 CALL HCHAR(23,15,84)
2600 CALL HCHAR(23,16,79)
2610 CALL KEY(0,RR,S)
2620 IF (RR>64)*(RR<73) THEN 2640
2630 GOTO 2610
2640 CALL SOUND(50,300,3)
2650 CALL HCHAR(23,18,RR)
2660 CALL KEY(0,CC,S)
2670 IF (CC>48)*(CC<57) THEN 2690
2680 GOTO 2660
2690 CALL SOUND(50,300,3)
```

Level 2 Games

```
2700 CALL HCHAR(23,20,CC)
2710 RR=2*RR-125
2720 CC=2*CC-90
2730 CALL GCHAR(RR,CC,G)
2740 IF G=96 THEN 2760
2750 GOTO 2560
2760 IF R-RR=2 THEN 2780
2770 GOTO 2560
2780 IF ABS(C-CC)=2 THEN 2800
2790 GOTO 2560
2800 CALL HCHAR(R,C,96)
2810 CALL HCHAR(R,C+1,96)
2820 CALL HCHAR(R+1,C,96)
2830 CALL HCHAR(R+1,C+1,96)
2840 CALL HCHAR(RR,CC,104)
2850 CALL HCHAR(RR,CC+1,105)
2860 CALL HCHAR(RR+1,CC,106)
2870 CALL HCHAR(RR+1,CC+1,107)
2880 KOUNT=KOUNT+1
2890 IF KOUNT<3 THEN 3650
2900 N=1
2910 A=FOXROW-4
2920 B=FOXCOLD-8
2930 IF (A>23)THEN 3010
2940 IF B<1 THEN 3010
2950 V(N)=0
2960 CALL GCHAR(A,B,G)
2970 IF G=96 THEN 3000
2980 IF G=128 THEN 3000
2990 GOTO 3010
3000 V(N)=1
3010 B=B+4
3020 IF B=FOXCOLD+12 THEN 3060
3030 IF B=FOXCOLD+10 THEN 3090
3040 N=N+1
3050 GOTO 2930
3060 B=FOXCOLD-6
3070 A=A+2
3080 GOTO 3040
3090 B=FOXCOLD-8
3100 A=A+2
3110 IF A<>FOXROW+8 THEN 3040
3120 IF (V(7)=0)*(V(8)=0)*(V(16)=0)*(V(17)=0)THEN
2330
3130 IF (V(7)=0)*(V(8)=0)*(V(16)=0)THEN 3700
3140 IF (V(7)=0)*(V(8)=0)*(V(17)=0)THEN 3650
3150 IF (V(7)=0)*(V(16)=0)*(V(17)=0)THEN 3600
3160 IF (V(8)=0)*(V(16)=0)*(V(17)=0)THEN 3480
3170 IF (V(17)=1)*(V(21)=1)*(V(22)=1)THEN 3700
```

Level 2 Games

```
3180 IF (V(16)=1)*(V(20)=1)*(V(21)=1)THEN 3650
3190 IF (V(8)=1)*(V(13)=1)*(V(18)=1)*(V(22)=1)*(V(
21)=1)*(V(26)=1)*(V(17)=0)THEN 3600
3200 IF (V(7)=1)*(V(11)=1)*(V(15)=1)*(V(20)=1)*(V(
21)=1)*(V(25)=1)*(V(16)=0)THEN 3480
3210 IF (V(8)=1)*(V(13)=1)*(V(18)=1)*(V(22)=1)*(V(
23)=1)THEN 3600
3220 IF (V(7)=1)*(V(11)=1)*(V(15)=1)*(V(20)=1)*(V(
19)=1)THEN 3480
3230 IF (V(17)=1)*(V(21)=1)*(V(25)=1)THEN 3700
3240 IF (V(17)=1)*(V(21)=1)*(V(26)=1)THEN 3700
3250 IF (V(17)=1)*(V(22)=1)*(V(26)=1)THEN 3700
3260 IF (V(17)=1)*(V(22)=1)*(V(27)=1)THEN 3700
3270 IF (V(16)=1)*(V(20)=1)*(V(24)=1)THEN 3650
3280 IF (V(16)=1)*(V(20)=1)*(V(25)=1)THEN 3650
3290 IF (V(16)=1)*(V(21)=1)*(V(25)=1)THEN 3650
3300 IF (V(16)=1)*(V(21)=1)*(V(26)=1)THEN 3650
3310 IF (V(16)=0)*(V(7)=1)*(V(11)=1)*(V(15)=1)*(V(
19)=1)THEN 3480
3320 IF (V(7)=1)*(V(11)=1)*(V(15)=1)*(V(20)=1)*(V(
24)=1)*(V(25)=1)THEN 3480
3330 IF (V(8)=1)*(V(13)=1)*(V(18)=1)*(V(22)=1)*(V(
26)=1)*(V(27)=1)THEN 3600
3340 IF (V(8)=1)*(V(9)=1)*(V(14)=1)*(V(18)=1)*(V(2
2)=1)*(V(23)=1)THEN 3600
3350 IF (V(7)=1)*(V(6)=1)*(V(10)=1)*(V(15)=1)*(V(1
9)=1)*(V(20)=1)THEN 3480
3360 IF (V(17)=0)*(V(8)=1)*(V(13)=1)*(V(18)=1)*(V(
23)=1)THEN 3600
3370 IF (V(16)=0)*(V(17)=0)*(V(7)=1)*(V(10)=1)THEN
3480
3380 IF (V(16)=0)*(V(17)=0)*(V(8)=1)*(V(14)=1)THEN
3600
3390 IF (V(16)=1)*(V(20)=0)*(V(21)=0)*(V(11)=0)*(V(
17)=0)*(V(8)=1)THEN 3600
3400 IF (V(17)=1)*(V(13)=0)*(V(22)=0)*(V(21)=0)*(V(
16)=0)*(V(7)=1)THEN 3480
3410 IF (V(21)=0)*(V(22)=0)*(V(18)=0)*(V(17)=1)THE
N 3700
3420 IF (V(16)=0)*(V(17)=0)*(V(7)=1)*(V(11)=1)*(V(
15)=1)THEN 3480
3430 IF (V(16)=0)*(V(17)=0)*(V(8)=1)*(V(13)=1)*(V(
18)=1)THEN 3600
3440 IF (V(16)=1)THEN 3650
3450 IF (V(17)=1)THEN 3700
3460 IF (V(7)=1)THEN 3480
3470 IF (V(6)=1)THEN 3600
3480 CALL HCHAR(FOXROW,FOXCOL,96,2)
3490 CALL HCHAR(FOXROW+1,FOXCOL,96,2)
```

Level 2 Games

```
3500 FOXROW=FOXROW-2
3510 FOXCOLD=FOXCOLD-2
3520 CALL HCHAR(FOXROW,FOXCOLD,112)
3530 CALL HCHAR(FOXROW,FOXCOLD+1,113)
3540 CALL HCHAR(FOXROW+1,FOXCOLD,114)
3550 CALL HCHAR(FOXROW+1,FOXCOLD+1,115)
3560 CALL SOUND(50,300,3)
3570 CALL HCHAR(23,5,32,20)
3580 IF FOXROW*2-8>32-KOUNT THEN 1110
3590 GOTO 2380
3600 CALL HCHAR(FOXROW,FOXCOLD,96,2)
3610 CALL HCHAR(FOXROW+1,FOXCOLD,96,2)
3620 FOXROW=FOXROW-2
3630 FOXCOLD=FOXCOLD+2
3640 GOTO 3520
3650 CALL HCHAR(FOXROW,FOXCOLD,96,2)
3660 CALL HCHAR(FOXROW+1,FOXCOLD,96,2)
3670 FOXROW=FOXROW+2
3680 FOXCOLD=FOXCOLD-2
3690 GOTO 3520
3700 CALL HCHAR(FOXROW,FOXCOLD,96,2)
3710 CALL HCHAR(FOXROW+1,FOXCOLD,96,2)
3720 FOXROW=FOXROW+2
3730 FOXCOLD=FOXCOLD+2
3740 GOTO 3520
3750 V(7)=0
3760 GOTO 3280
3770 V(6)=0
3780 GOTO 3280
3790 FOR DELAY=1 TO 700
3800 NEXT DELAY
3810 CALL CLEAR
3820 PRINT "AGAIN (Y OR N)?":
3830 CALL KEY(0,K,S)
3840 IF K=78 THEN 3870
3850 IF K=89 THEN 3890
3860 GOTO 3830
3870 CALL CLEAR
3880 END
3890 KOUNT=0
3900 GOTO 120
```

Name the States

Skill area: Social Studies**Level: 2, 3**

How well can you identify the locations of each of the contiguous 48 states of the US? "Name the States" will teach and test your ability to locate states.

A map of a section of the United States will appear on the screen. The section of the United States that appears depends on which of the four programs has been selected. Also displayed on the screen will be the names of all the states included in the map, and sometimes other states as well. Each state has a number associated with it. A square flashes inside one of the states, and you must enter the number corresponding to the name of that state. If a wrong number is entered, the computer makes an unpleasant noise, and you are given another chance. If the correct answer is entered, the screen flashes colors, and then the program goes on to another state. This continues until all of the states on the map have been identified correctly.

The maps for these four programs were drawn by placing a piece of tracing paper over a map in an atlas, and then drawing a grid on the tracing paper. This grid corresponds to the coordinates on the screen determined by the CALL HCHAR command. Then the character within each cell of the grid was designed, using the CALL CHAR command.

Program 1. Northeastern States

```
100 REM  NORTHEASTERN STATES
110 REM
120 CALL CLEAR
130 PRINT "10 NORTH CAROLINA"
140 PRINT "11 NEW HAMPSHIRE"
150 PRINT "12 MASSACHUSETTS"
160 PRINT "13 WEST VIRGINIA"
170 PRINT "14 RHODE ISLAND"
180 PRINT "15 PENNSYLVANIA"
190 PRINT "16 NEW JERSEY"
200 PRINT "17 TENNESSEE"
210 PRINT "18 KENTUCKY"
220 PRINT "19 NEW YORK"
230 PRINT "20 DELAWARE"
```

Level 2 Games

```
240 PRINT "21 VIRGINIA"
250 PRINT "22 GEORGIA"
260 PRINT "23 VERMONT"
270 PRINT "24 INDIANA"
280 PRINT "25 MAINE"
290 PRINT "26 OHIO"
300 PRINT "27 IOWA"
310 PRINT "28 ILLINOIS"
320 PRINT "29 MARYLAND"
330 PRINT "30 CONNECTICUT"
340 PRINT
350 CALL CHAR(91,"F00C040404040404")
360 CALL HCHAR(2,28,91)
370 CALL CHAR(92,"0202020202020101")
380 CALL HCHAR(3,28,92)
390 CALL CHAR(93,"80E020202020203C")
400 CALL HCHAR(4,29,93)
410 CALL CHAR(94,"0402010101020CF0")
420 CALL HCHAR(5,29,94)
430 CALL CHAR(95,"0102040810204080")
440 CALL HCHAR(6,28,95)
450 CALL CHAR(96,"030C30C")
460 CALL HCHAR(7,27,96)
470 CALL CHAR(97,"0000000001010204")
480 CALL HCHAR(7,26,97)
490 CALL CHAR(98,"888848503010F090")
500 CALL HCHAR(8,26,98)
510 CALL CHAR(99,"1008081020403808")
520 CALL HCHAR(9,26,99)
530 CALL CHAR(100,"08040201844A9F0")
540 CALL HCHAR(10,26,100)
550 CALL CHAR(101,"40203030E808F808")
560 CALL HCHAR(10,27,101)
570 CALL CHAR(102,"0000FC2221202121")
580 CALL HCHAR(10,25,102)
590 CALL CHAR(103,"21263CF00000F0C0")
600 CALL HCHAR(11,25,103)
610 CALL CHAR(104,"0102FC")
620 CALL HCHAR(9,25,104)
630 CALL CHAR(105,"0000FF")
640 CALL VCHAR(9,24,105,2)
650 CALL CHAR(106,"08080F0808080808")
660 CALL VCHAR(9,23,106,2)
670 CALL CHAR(107,"0000000F70801FE0")
680 CALL HCHAR(11,24,107)
690 CALL CHAR(108,"0808080808112638")
700 CALL HCHAR(11,23,108)
710 CALL CHAR(109,"899E808FF")
720 CALL HCHAR(12,23,109)
```

Level 2 Games

```
730 CALL CHAR(110,"010618E0")
740 CALL HCHAR(12,24,110)
750 CALL CHAR(111,"0202010101010101")
760 CALL HCHAR(7,25,111)
770 CALL CHAR(112,"4444428282820202")
780 CALL HCHAR(6,25,112)
790 CALL CHAR(113,"01020C384848C844")
800 CALL HCHAR(5,25,113)
810 CALL CHAR(114,"2020202040408080")
820 CALL HCHAR(4,26,114)
830 CALL CHAR(115,"1010101020202020")
840 CALL HCHAR(3,26,115)
850 CALL CHAR(116,"0101020204040808")
860 CALL HCHAR(2,26,116)
870 CALL CHAR(117,"E1121C")
880 CALL HCHAR(2,27,117)
890 CALL CHAR(118,"00000000000000FF0")
900 CALL HCHAR(5,24,118)
910 CALL CHAR(119,"00000000000000102")
920 CALL HCHAR(6,24,119)
930 CALL CHAR(120,"0202020404080808")
940 CALL HCHAR(7,24,120)
950 CALL CHAR(121,"0808080810101010")
960 CALL HCHAR(8,24,121)
970 CALL CHAR(122,"1010FF")
980 CALL HCHAR(9,24,122)
990 CALL CHAR(123,"FF10101010101010")
1000 CALL HCHAR(6,23,123)
1010 CALL CHAR(124,"1010101010101010")
1020 CALL HCHAR(7,23,124)
1030 CALL CHAR(125,"0808080808080808")
1040 CALL HCHAR(8,23,125)
1050 CALL CHAR(126,"0FF")
1060 CALL HCHAR(6,22,126)
1070 CALL CHAR(127,"00030C30C")
1080 CALL HCHAR(6,21,127)
1090 CALL CHAR(128,"0000000001020408")
1100 CALL HCHAR(6,20,128)
1110 CALL CHAR(129,"0810204040404040")
1120 CALL HCHAR(7,20,129)
1130 CALL CHAR(130,"404040408080")
1140 CALL HCHAR(8,20,130)
1150 CALL CHAR(131,"00000000000003FC00")
1160 CALL HCHAR(8,19,131)
1170 CALL CHAR(132,"00000000000000FF00")
1180 CALL HCHAR(8,18,132)
1190 CALL CHAR(133,"00000000000000F10")
1200 CALL HCHAR(8,17,133)
1210 CALL CHAR(134,"1020202010102040")
```

Level 2 Games

1220 CALL HCHAR(9,17,134)
1230 CALL CHAR(135,"408000000000FF00")
1240 CALL HCHAR(10,17,135)
1250 CALL CHAR(136,"000001020C34C7")
1260 CALL HCHAR(10,16,136)
1270 CALL HCHAR(10,18,132,3)
1280 CALL CHAR(137,"000000000000F008")
1290 CALL HCHAR(10,21,137)
1300 CALL CHAR(138,"08040201")
1310 CALL HCHAR(11,21,138)
1320 CALL CHAR(139,"0000000080704E81")
1330 CALL HCHAR(11,22,139)
1340 CALL CHAR(140,"0102020404040201")
1350 CALL HCHAR(12,21,140)
1360 CALL CHAR(141,"0000000000010201")
1370 CALL HCHAR(12,22,141)
1380 CALL CHAR(142,"808040404080")
1390 CALL HCHAR(13,22,142)
1400 CALL CHAR(143,"8040404040808080")
1410 CALL HCHAR(13,23,143)
1420 CALL CHAR(144,"010202040408C848")
1430 CALL HCHAR(14,22,144)
1440 CALL CHAR(145,"0000000000010238")
1450 CALL HCHAR(13,21,145)
1460 CALL CHAR(146,"44C848444A4A4948")
1470 CALL HCHAR(14,21,146)
1480 CALL CHAR(147,"3808000080404040")
1490 CALL HCHAR(15,22,147)
1500 CALL CHAR(148,"424221212020203F")
1510 CALL HCHAR(15,21,148)
1520 CALL CHAR(149,"00FF000018242424")
1530 CALL HCHAR(14,20,149)
1540 CALL CHAR(150,"0000000000000001")
1550 CALL HCHAR(10,15,150)
1560 CALL CHAR(151,"0202020202020202")
1570 CALL VCHAR(11,15,151,3)
1580 CALL CHAR(152,"121320204080")
1590 CALL HCHAR(14,15,152)
1600 CALL CHAR(153,"00FF")
1610 CALL HCHAR(14,16,153)
1620 CALL CHAR(154,"00FF808080808080")
1630 CALL HCHAR(14,17,154)
1640 CALL CHAR(155,"00FF0018E402314F")
1650 CALL HCHAR(14,18,155)
1660 CALL CHAR(156,"00FF00000000C020")
1670 CALL HCHAR(14,19,156)
1680 CALL CHAR(157,"2020180402020204")
1690 CALL HCHAR(15,19,157)
1700 CALL CHAR(158,"040807")

```

1710 CALL HCHAR(16,19,158)
1720 CALL CHAR(159,"1414121212121212")
1730 CALL HCHAR(15,20,159)
1740 CALL CHAR(33,"1414937080403804")
1750 CALL HCHAR(16,20,33)
1760 CALL CHAR(34,"0000C02117091212")
1770 CALL HCHAR(16,21,34)
1780 CALL CHAR(35,"40408")
1790 CALL HCHAR(16,22,35)
1800 CALL CHAR(36,"02120A0602040402")
1810 CALL HCHAR(17,20,36)
1820 CALL CHAR(37,"121224242428281")
1830 CALL HCHAR(17,21,37)
1840 CALL CHAR(38,"02010000000000FF")
1850 CALL HCHAR(18,20,38)
1860 CALL CHAR(39,"00008040201010E")
1870 CALL HCHAR(18,21,39)
1880 CALL CHAR(40,"00000000000000FF")
1890 CALL HCHAR(18,16,40,4)
1900 CALL CHAR(41,"F000000000000000FF")
1910 CALL HCHAR(18,15,41)
1920 CALL CHAR(42,"800F0000000000FF")
1930 CALL HCHAR(18,14,42)
1940 CALL CHAR(43,"01060830408000FF")
1950 CALL HCHAR(18,13,43)
1960 CALL CHAR(44,"0000000000003040F")
1970 CALL HCHAR(18,12,44)
1980 CALL CHAR(45,"0000000000000040A")
1990 CALL HCHAR(17,14,45)
2000 CALL CHAR(46,"00000000000030408")
2010 CALL HCHAR(17,15,46)
2020 CALL CHAR(47,"102020404080")
2030 CALL HCHAR(17,16,47)
2040 CALL CHAR(58,"0002050408081010")
2050 CALL HCHAR(16,16,58)
2060 CALL CHAR(59,"1020C")
2070 CALL HCHAR(16,17,59)
2080 CALL CHAR(60,"0000000001020C10")
2090 CALL HCHAR(15,17,60)
2100 CALL CHAR(61,"42404080")
2110 CALL HCHAR(15,18,61)
2120 CALL CHAR(62,"0808040402020101")
2130 CALL HCHAR(17,13,62)
2140 CALL CHAR(63,"0102020408101008")
2150 CALL HCHAR(16,13,63)
2160 CALL CHAR(64,"0408081020408080")
2170 CALL HCHAR(15,14,64)
2180 CALL CHAR(81,"00000000000010608")
2190 CALL HCHAR(14,14,81)

```

Level 2 Games

```
2200 CALL CHAR(90,"02060A0A0A0A0A12")
2210 CALL HCHAR(13,15,90)
2220 RANDOMIZE
2230 D=4
2240 DIM A(13),PL(4,13),CC$(13)
2250 FOR STATE=1 TO 13
2260 FOR ITEM=1 TO 4
2270 READ PL(ITEM,STATE)
2280 NEXT ITEM
2290 READ CC$(STATE)
2300 NEXT STATE
2310 FOR N=1 TO 13
2320 R=INT(RND*13+1)
2330 IF A(R)=1 THEN 2320
2340 A(R)=1
2350 ROW=PL(1,R)
2360 COL=PL(2,R)
2370 J=PL(3,R)
2380 JJ=PL(4,R)
2390 CALL CHAR(88,CC$(R))
2400 CALL GCHAR(ROW,COL,G)
2410 CALL HCHAR(ROW,COL,88)
2420 FOR DELAY=1 TO 10
2430 NEXT DELAY
2440 CALL HCHAR(ROW,COL,G)
2450 CALL KEY(0,K,S)
2460 FOR DELAY=1 TO 5
2470 NEXT DELAY
2480 IF (K>48)*(K<52)THEN 2500
2490 GOTO 2410
2500 CALL SOUND(100,300,3)
2510 CALL HCHAR(22,25,K)
2520 CALL HCHAR(ROW,COL,88)
2530 FOR DELAY=1 TO 10
2540 NEXT DELAY
2550 CALL HCHAR(ROW,COL,G)
2560 CALL KEY(0,KK,S)
2570 FOR DELAY=1 TO 10
2580 NEXT DELAY
2590 IF ((KK>47)*(KK<58))THEN 2610
2600 GOTO 2520
2610 CALL HCHAR(22,26,KK)
2620 IF (K=J)*(KK=JJ)THEN 2660
2630 CALL SOUND(300,-3,2)
2640 CALL HCHAR(22,25,32,2)
2650 GOTO 2410
2660 CALL SOUND(100,300,3)
2670 FOR FLASH=1 TO 10
2680 CALL SCREEN(12+D)
```

```

2690 FOR DELAY=1 TO 20
2700 NEXT DELAY
2710 D=-D
2720 NEXT FLASH
2730 CALL HCHAR(22,25,32,2)
2740 NEXT N
2750 END
2760 DATA 8,25,49,49,FFFFFFFFFFFFFFFF
2770 DATA 9,25,49,50,0103FFFFFFFFFFFF
2780 DATA 16,15,49,51,FFFFFFFFFFFFFFFF
2790 DATA 10,25,49,52,0000FC3E3F3F3F3F
2800 DATA 12,19,49,53,FFFFFFFFFFFFFFFF
2810 DATA 13,22,49,54,FF7F3F3F7FFFFFFF
2820 DATA 9,21,49,57,FFFFFFFFFFFFFFFF
2830 DATA 15,21,50,48,7E7E3F3F3F3F3F3F
2840 DATA 17,18,50,49,FFFFFFFFFFFFFFFF
2850 DATA 6,24,50,51,FFFFFFFFFFFFFFFF
2860 DATA 5,27,50,53,FFFFFFFFFFFFFFFF
2870 DATA 15,20,50,57,FFFFFFFFFFFFFFFF
2880 DATA 10,24,51,48,0000FFFFFFFFFFFF

```

Program 2. Midwestern States

```

100 REM MIDWESTERN STATES
110 REM
120 CALL CLEAR
130 PRINT "10 OHIO"
140 PRINT "11 IOWA"
150 PRINT "12 KANSAS"
160 PRINT "13 INDIANA";
170 PRINT TAB(16);"18 WISCONSIN"
180 PRINT "14 MICHIGAN";
190 PRINT TAB(16);"19 ILLINOIS"
200 PRINT "15 KENTUCKY";
210 PRINT TAB(16);"20 MINNESOTA"
220 PRINT "16 N DAKOTA";
230 PRINT TAB(16);"21 MISSOURI"
240 PRINT "17 S DAKOTA";
250 PRINT TAB(16);"22 NEBRASKA"
260 PRINT ::
270 CALL CHAR(64,"FFFFFFFFFFFFFFFF")
280 CALL CHAR(91,"0000000000000060A0")
290 CALL HCHAR(9,28,91)
300 CALL CHAR(92,"2020202020202020")
310 CALL HCHAR(10,28,92)
320 CALL CHAR(93,"2020202040404040")
330 CALL HCHAR(11,28,93)
340 CALL CHAR(94,"40C")
350 CALL HCHAR(12,28,94)
360 CALL CHAR(95,"0000010202040408")

```

Level 2 Games

```
370 CALL HCHAR(12,27,95)
380 CALL CHAR(96,"1020C08080402010")
390 CALL HCHAR(13,27,96)
400 CALL CHAR(97,"101020408080")
410 CALL HCHAR(14,27,97)
420 CALL CHAR(98,"0000000000000102")
430 CALL HCHAR(14,26,98)
440 CALL CHAR(99,"0408F")
450 CALL HCHAR(15,26,99)
460 CALL CHAR(100,"00FC03")
470 CALL HCHAR(13,26,100)
480 CALL CHAR(101,"0106F8")
490 CALL HCHAR(10,27,101)
500 CALL CHAR(102,"C0201F")
510 CALL HCHAR(10,26,102)
520 CALL CHAR(103,"0202040408081020")
530 CALL HCHAR(9,26,103)
540 CALL CHAR(104,"0404040404020202")
550 CALL HCHAR(8,26,104)
560 CALL CHAR(105,"4040800000304888")
570 CALL HCHAR(7,26,105)
580 CALL CHAR(106,"0000000102040407")
590 CALL HCHAR(7,25,106)
600 CALL CHAR(107,"0000008080808080")
610 CALL HCHAR(6,26,107)
620 CALL CHAR(108,"C0300F")
630 CALL HCHAR(6,25,108)
640 CALL CHAR(109,"000000C020C00000")
650 CALL HCHAR(5,25,109)
660 CALL CHAR(110,"F0101F0000003FC0")
670 CALL HCHAR(5,24,110)
680 CALL CHAR(111,"0304040810204080")
690 CALL HCHAR(6,24,111)
700 CALL CHAR(112,"4181010202020202")
710 CALL HCHAR(7,23,112)
720 CALL CHAR(113,"0202020201010101")
730 CALL HCHAR(8,23,113)
740 CALL CHAR(114,"0101010102020284")
750 CALL HCHAR(9,23,114)
760 CALL CHAR(115,"87B8808080808080")
770 CALL HCHAR(10,23,115)
780 CALL CHAR(116,"FF")
790 CALL HCHAR(10,24,116)
800 CALL CHAR(117,"FF80808080808080")
810 CALL HCHAR(10,25,117)
820 CALL CHAR(118,"8080808080808090")
830 CALL HCHAR(11,25,118)
840 CALL CHAR(119,"0101FF0101010100")
850 CALL HCHAR(9,22,119)
```

```

860 CALL CHAR(120,"0102020202010101")
870 CALL HCHAR(8,22,120)
880 CALL CHAR(121,"0502010101010101")
890 CALL HCHAR(7,22,121)
900 CALL CHAR(122,"0404020101020204")
910 CALL HCHAR(6,22,122)
920 CALL CHAR(123,"204080002060A0A0")
930 CALL HCHAR(6,23,123)
940 CALL CHAR(124,"00C33C0000000013E")
950 CALL HCHAR(5,23,124)
960 CALL CHAR(125,"02010000000806018")
970 CALL HCHAR(5,22,125)
980 CALL CHAR(126,"00000C142848900F")
990 CALL HCHAR(4,22,126)
1000 CALL CHAR(127,"8000000000000031C")
1010 CALL HCHAR(4,21,127)
1020 CALL CHAR(128,"408040300E010000")
1030 CALL HCHAR(5,21,128)
1040 CALL CHAR(129,"880C03")
1050 CALL HCHAR(5,20,129)
1060 CALL CHAR(130,"00030C3040800070")
1070 CALL HCHAR(4,20,130)
1080 CALL CHAR(131,"0000000080402080")
1090 CALL HCHAR(3,21,131)
1100 CALL CHAR(132,"00000000FF")
1110 CALL HCHAR(3,20,132)
1120 CALL HCHAR(4,19,98)
1130 CALL CHAR(133,"0304040810202020")
1140 CALL HCHAR(5,19,133)
1150 CALL CHAR(134,"2010101020404020")
1160 CALL HCHAR(6,19,134)
1170 CALL CHAR(135,"1008040201")
1180 CALL HCHAR(7,19,135)
1190 CALL CHAR(136,"00000000000804040")
1200 CALL HCHAR(7,20,136)
1210 CALL CHAR(137,"C040402020201010")
1220 CALL HCHAR(8,20,137)
1230 CALL CHAR(138,"1008070201010101")
1240 CALL HCHAR(9,20,138)
1250 CALL CHAR(139,"0000FF")
1260 CALL HCHAR(9,21,139)
1270 CALL VCHAR(11,23,118,2)
1280 CALL CHAR(140,"0101010101020203")
1290 CALL HCHAR(13,22,140)
1300 CALL HCHAR(14,23,116)
1310 CALL CHAR(141,"00000102020408F0")
1320 CALL HCHAR(13,24,141)
1330 CALL CHAR(142,"418")
1340 CALL HCHAR(13,25,142)

```

Level 2 Games

1350 CALL CHAR(143,"808080804040704F")
1360 CALL HCHAR(12,25,143)
1370 CALL HCHAR(15,23,139,3)
1380 CALL CHAR(144,"C08080FF")
1390 CALL HCHAR(15,22,144)
1400 CALL CHAR(145,"0102020408102040")
1410 CALL HCHAR(14,22,145)
1420 CALL CHAR(146,"2020101008040201")
1430 CALL HCHAR(14,21,146)
1440 CALL CHAR(147,"8080808080804020")
1450 CALL HCHAR(13,21,147)
1460 CALL CHAR(148,"4040201008080403")
1470 CALL HCHAR(12,20,148)
1480 CALL CHAR(149,"1020C04040404040")
1490 CALL HCHAR(11,20,149)
1500 CALL CHAR(150,"0102040810100808")
1510 CALL HCHAR(10,20,150)
1520 CALL CHAR(151,"8060180601")
1530 CALL HCHAR(3,19,151)
1540 CALL CHAR(152,"231C")
1550 CALL HCHAR(3,18,152)
1560 CALL CHAR(153,"0000000000804020")
1570 CALL HCHAR(2,18,153)
1580 CALL CHAR(154,"00000000FF")
1590 CALL HCHAR(2,17,154)
1600 CALL CHAR(155,"00000000FF404040")
1610 CALL HCHAR(2,16,155)
1620 CALL CHAR(156,"4040404040404040")
1630 CALL HCHAR(3,16,156)
1640 CALL CHAR(157,"2020202020202020")
1650 CALL HCHAR(4,16,157)
1660 CALL CHAR(158,"20202020E0202020")
1670 CALL HCHAR(5,16,158)
1680 CALL VCHAR(6,16,157,2)
1690 CALL CHAR(159,"3F2020202020A060")
1700 CALL HCHAR(8,16,159)
1710 CALL HCHAR(8,17,116,3)
1720 CALL CHAR(33,"2020101010080808")
1730 CALL HCHAR(9,16,33)
1740 CALL CHAR(34,"0404040202020101")
1750 CALL HCHAR(10,16,34)
1760 CALL CHAR(35,"8080FF8080402020")
1770 CALL HCHAR(11,17,35)
1780 CALL HCHAR(11,18,139,2)
1790 CALL VCHAR(12,17,157,2)
1800 CALL CHAR(36,"2020202020E02020")
1810 CALL HCHAR(14,17,36)
1820 CALL CHAR(37,"20203F")
1830 CALL HCHAR(15,17,37)

```
1840 CALL HCHAR(15,18,139,3)
1850 CALL CHAR(40,"0000C14244447C")
1860 CALL HCHAR(15,21,40)
1870 CALL HCHAR(2,12,154,4)
1880 CALL CHAR(41,"00000000FF808080")
1890 CALL HCHAR(2,11,41)
1900 CALL VCHAR(3,11,118,2)
1910 CALL CHAR(42,"80808080FF808080")
1920 CALL HCHAR(5,11,42)
1930 CALL HCHAR(5,12,154,4)
1940 CALL VCHAR(6,11,118,2)
1950 CALL CHAR(43,"8080FF8080808080")
1960 CALL HCHAR(8,11,43)
1970 CALL HCHAR(8,12,139,3)
1980 CALL CHAR(44,"000000C0300C0300")
1990 CALL HCHAR(8,15,44)
2000 CALL HCHAR(9,11,118)
2010 CALL HCHAR(10,11,116)
2020 CALL CHAR(45,"E020202020202020")
2030 CALL HCHAR(10,12,45)
2040 CALL CHAR(46,"20202020203F2020")
2050 CALL HCHAR(11,12,46)
2060 CALL CHAR(47,"0000000000FF0000")
2070 CALL HCHAR(11,13,47,4)
2080 CALL VCHAR(12,12,157,2)
2090 CALL HCHAR(14,12,46)
2100 CALL HCHAR(14,13,47,4)
2110 RANDOMIZE
2120 D=4
2130 DIM A(13),PL(4,13)
2140 FOR STATE=1 TO 13
2150 FOR ITEM=1 TO 4
2160 READ PL(ITEM,STATE)
2170 NEXT ITEM
2180 NEXT STATE
2190 FOR N=1 TO 13
2200 R=INT(RND*13+1)
2210 IF A(R)=1 THEN 2200
2220 A(R)=1
2230 ROW=PL(1,R)
2240 COL=PL(2,R)
2250 J=PL(3,R)
2260 JJ=PL(4,R)
2270 CALL HCHAR(ROW,COL,64)
2280 FOR DELAY=1 TO 10
2290 NEXT DELAY
2300 CALL HCHAR(ROW,COL,32)
2310 CALL KEY(0,K,S)
2320 FOR DELAY=1 TO 10
```

Level 2 Games

```
2330 NEXT DELAY
2340 IF (K>48)*(K<51)THEN 2360
2350 GOTO 2270
2360 CALL SOUND(100,300,3)
2370 CALL HCHAR(24,25,K)
2380 CALL HCHAR(ROW,COL,64)
2390 FOR DELAY=1 TO 10
2400 NEXT DELAY
2410 CALL HCHAR(ROW,COL,32)
2420 CALL KEY(0,KK,S)
2430 FOR DELAY=1 TO 10
2440 NEXT DELAY
2450 IF (KK>47)*(KK<58)THEN 2470
2460 GOTO 2380
2470 CALL HCHAR(24,26,KK)
2480 IF (K=J)*(KK=JJ)THEN 2520
2490 CALL SOUND(300,-3,2)
2500 CALL HCHAR(24,25,32,2)
2510 GOTO 2270
2520 CALL SOUND(100,300,3)
2530 FOR FLASH=1 TO 10
2540 CALL SCREEN(12+D)
2550 FOR DELAY=1 TO 25
2560 NEXT DELAY
2570 D=-D
2580 NEXT FLASH
2590 CALL HCHAR(24,25,32,2)
2600 NEXT N
2610 END
2620 DATA 14,25,49,53
2630 DATA 13,19,50,49
2640 DATA 11,26,49,48
2650 DATA 9,14,50,50
2660 DATA 13,14,49,50
2670 DATA 8,25,49,52
2680 DATA 9,18,49,49
2690 DATA 3,14,49,54
2700 DATA 6,14,49,55
2710 DATA 7,21,49,56
2720 DATA 11,24,49,51
2730 DATA 5,18,50,48
2740 DATA 11,21,49,57
```

Program 3. Southern States

```
100 REM SOUTHERN STATES
110 REM
120 CALL CLEAR
130 PRINT TAB(19);"10 GEORGIA"
140 PRINT TAB(19);"11 ALABAMA"
```

```
150 PRINT TAB(18);"12 ARKANSAS"
160 PRINT TAB(18);"13 KENTUCKY"
170 PRINT TAB(19);"14 FLORIDA"
180 PRINT ::
190 PRINT "15 VIRGINIA"
200 PRINT "16 MISSOURI"
210 PRINT "17 TENNESSEE"
220 PRINT "18 N CAROLINA"
230 PRINT "19 S CAROLINA"
240 PRINT "20 LOUISIANA"
250 PRINT "21 MISSISSIPPI"
260 PRINT
270 CALL CHAR(46,"FFFFFFFFFFFFFFFF")
280 CALL CHAR(90,"0000001F10101010")
290 CALL HCHAR(5,4,90)
300 CALL CHAR(91,"000000FF00000000")
310 CALL HCHAR(5,5,91,3)
320 CALL CHAR(92,"000000F808081010")
330 CALL HCHAR(5,8,92)
340 CALL CHAR(93,"111F010102020404")
350 CALL HCHAR(6,8,93)
360 CALL CHAR(94,"101020203F404080")
370 CALL HCHAR(5,9,94)
380 CALL CHAR(95,"00000000000030408")
390 CALL HCHAR(4,9,95)
400 CALL CHAR(96,"0F08101020408000")
410 CALL HCHAR(4,10,96)
420 CALL CHAR(97,"00000000000031CE0")
430 CALL HCHAR(3,11,97)
440 CALL CHAR(98,"0102040808F00000")
450 CALL HCHAR(3,12,98)
460 CALL CHAR(99,"000000182C234080")
470 CALL HCHAR(2,13,99)
480 CALL CHAR(100,"0000000000C03F00")
490 CALL HCHAR(2,14,100)
500 CALL CHAR(101,"0000000000609008")
510 CALL HCHAR(2,15,101)
520 CALL CHAR(102,"0808080804040202")
530 CALL HCHAR(3,15,102)
540 CALL CHAR(103,"0100010204081020")
550 CALL HCHAR(4,15,103)
560 CALL CHAR(104,"0080403F")
570 CALL HCHAR(4,16,104)
580 CALL CHAR(105,"18608")
590 CALL HCHAR(4,17,105)
600 CALL CHAR(106,"0101020202040404")
610 CALL HCHAR(3,17,106)
620 CALL CHAR(107,"0102040810204080")
630 CALL HCHAR(2,18,107)
```

Level 2 Games

```
640 CALL CHAR(108, "0000000000E314080")
650 CALL HCHAR(1, 19, 108)
660 CALL CHAR(109, "0000000000000C030")
670 CALL HCHAR(1, 20, 109)
680 CALL CHAR(110, "1010202020380C03")
690 CALL HCHAR(2, 20, 110)
700 CALL CHAR(111, "C020101010101008")
710 CALL HCHAR(3, 21, 111)
720 CALL CHAR(112, "080402020101FF01")
730 CALL HCHAR(4, 21, 112)
740 CALL CHAR(113, "8080404040408080")
750 CALL HCHAR(5, 22, 113)
760 CALL CHAR(114, "0102040810204080")
770 CALL HCHAR(6, 21, 114)
780 CALL CHAR(115, "01010202040408F0")
790 CALL HCHAR(7, 20, 115)
800 CALL CHAR(116, "0502040404080810")
810 CALL HCHAR(8, 19, 116)
820 CALL CHAR(117, "20408")
830 CALL HCHAR(9, 19, 117)
840 CALL CHAR(118, "000000001020C1020")
850 CALL HCHAR(9, 18, 118)
860 CALL CHAR(119, "408")
870 CALL HCHAR(10, 18, 119)
880 CALL CHAR(120, "1008050202040408")
890 CALL HCHAR(10, 17, 120)
900 CALL CHAR(121, "0810101010101010")
910 CALL HCHAR(11, 17, 121)
920 CALL CHAR(122, "F010080808080808")
930 CALL HCHAR(12, 17, 122)
940 CALL CHAR(123, "0404040202020101")
950 CALL HCHAR(13, 17, 123)
960 CALL CHAR(124, "8040402020101008")
970 CALL HCHAR(14, 18, 124)
980 CALL CHAR(125, "0804040202020101")
990 CALL HCHAR(15, 18, 125)
1000 CALL CHAR(126, "8080404020202010")
1010 CALL HCHAR(16, 19, 126)
1020 CALL CHAR(127, "1010101020202040")
1030 CALL HCHAR(17, 19, 127)
1040 CALL CHAR(128, "40404080")
1050 CALL HCHAR(18, 19, 128)
1060 CALL CHAR(129, "80402020130C")
1070 CALL HCHAR(18, 18, 129)
1080 CALL CHAR(130, "8040201008040201")
1090 CALL HCHAR(17, 17, 130)
1100 CALL HCHAR(16, 16, 123)
1110 CALL CHAR(131, "2020202010100808")
1120 CALL HCHAR(15, 16, 131)
```

1130 CALL CHAR(132,"8040202020202020")
1140 CALL HCHAR(14,16,132)
1150 CALL HCHAR(13,15,130)
1160 CALL CHAR(133,"071820408")
1170 CALL HCHAR(13,14,133)
1180 CALL CHAR(134,"804020100F")
1190 CALL HCHAR(13,13,134)
1200 CALL CHAR(135,"FF000000000000F807")
1210 CALL HCHAR(12,12,135)
1220 CALL CHAR(136,"3F20202020203FC")
1230 CALL HCHAR(12,11,136)
1240 CALL CHAR(137,"202020202225F101")
1250 CALL HCHAR(12,10,137)
1260 CALL CHAR(138,"8080808080808080FF0")
1270 CALL HCHAR(12,9,138)
1280 CALL HCHAR(13,9,113)
1290 CALL CHAR(139,"FF")
1300 CALL HCHAR(14,8,139)
1310 CALL CHAR(140,"00000000000080403F")
1320 CALL HCHAR(13,7,140)
1330 CALL CHAR(141,"00000000FF1")
1340 CALL HCHAR(13,6,141)
1350 CALL CHAR(142,"000000F00F")
1360 CALL HCHAR(13,5,142)
1370 CALL CHAR(143,"01010203")
1380 CALL HCHAR(13,4,143)
1390 CALL CHAR(144,"4040404080808080")
1400 CALL HCHAR(12,5,144)
1410 CALL CHAR(145,"8080804040404040")
1420 CALL HCHAR(11,5,145)
1430 CALL CHAR(146,"0202020202020101")
1440 CALL HCHAR(10,4,146)
1450 CALL CHAR(147,"0202020203020202")
1460 CALL HCHAR(9,4,147)
1470 CALL CHAR(148,"1010101010101010E02")
1480 CALL HCHAR(8,4,148)
1490 CALL CHAR(149,"1010101010101010")
1500 CALL VCHAR(6,4,149,2)
1510 CALL CHAR(150,"00000000FF000000")
1520 CALL HCHAR(9,5,150,2)
1530 CALL CHAR(152,"08080808F8080808")
1540 CALL HCHAR(9,7,152)
1550 CALL CHAR(153,"0804040408081010")
1560 CALL HCHAR(10,7,153)
1570 CALL CHAR(154,"1010202040408080")
1580 CALL HCHAR(11,7,154)
1590 CALL CHAR(155,"FF")
1600 CALL HCHAR(12,7,155,2)
1610 CALL CHAR(156,"0101020204040808")

Level 2 Games

1620 CALL HCHAR(8,7,156)
1630 CALL CHAR(157,"08081F1020204080")
1640 CALL HCHAR(7,8,157)
1650 CALL CHAR(158,"0000FF")
1660 CALL HCHAR(7,9,158)
1670 CALL CHAR(159,"0000FF2020202020")
1680 CALL HCHAR(7,10,159)
1690 CALL CHAR(33,"2020202020202020")
1700 CALL VCHAR(8,10,33,4)
1710 CALL HCHAR(7,11,158,2)
1720 CALL CHAR(34,"0000FF8080808040")
1730 CALL HCHAR(7,13,34)
1740 CALL CHAR(35,"4040404020202020")
1750 CALL HCHAR(8,13,35)
1760 CALL CHAR(36,"2020101010080808")
1770 CALL HCHAR(9,13,36)
1780 CALL CHAR(37,"0804040202040404")
1790 CALL HCHAR(10,13,37)
1800 CALL CHAR(38,"0404040404040404")
1810 CALL HCHAR(11,13,38)
1820 CALL CHAR(39,"FC0407")
1830 CALL HCHAR(12,13,39)
1840 CALL HCHAR(12,14,158,2)
1850 CALL CHAR(40,"0302F20A0C")
1860 CALL HCHAR(12,16,40)
1870 CALL CHAR(41,"00000704FC")
1880 CALL HCHAR(5,10,41)
1890 CALL HCHAR(5,11,158,4)
1900 CALL CHAR(42,"407F800000000030C")
1910 CALL HCHAR(5,15,42)
1920 CALL CHAR(43,"00FF081020408000")
1930 CALL HCHAR(5,16,43)
1940 CALL CHAR(44,"00FF")
1950 CALL HCHAR(5,17,44)
1960 CALL HCHAR(5,18,155,2)
1970 CALL CHAR(45,"00000000000000FF")
1980 CALL HCHAR(4,20,45)
1990 CALL CHAR(47,"081020C0")
2000 CALL HCHAR(6,15,47)
2010 CALL CHAR(58,"0000000106182020")
2020 CALL HCHAR(6,14,58)
2030 CALL CHAR(59,"407FC")
2040 CALL HCHAR(7,14,59)
2050 CALL CHAR(60,"07F8202010080402")
2060 CALL HCHAR(7,15,60)
2070 CALL CHAR(61,"0201")
2080 CALL HCHAR(8,15,61)
2090 CALL CHAR(62,"0000804020100804")
2100 CALL HCHAR(8,16,62)

Level 2 Games

```
2110 CALL HCHAR(9,16,61)
2120 CALL CHAR(63,"0000804040202010")
2130 CALL HCHAR(9,17,63)
2140 CALL HCHAR(6,16,45)
2150 CALL CHAR(64,"000000000000000F")
2160 CALL HCHAR(6,17,64)
2170 CALL CHAR(81,"101F")
2180 CALL HCHAR(7,17,81)
2190 CALL CHAR(87,"00FC03")
2200 CALL HCHAR(7,18,87)
2210 CALL HCHAR(7,19,62)
2220 RANDOMIZE
2230 D=4
2240 DIM A(11),PL(4,11)
2250 FOR STATE=1 TO 11
2260 FOR ITEM=1 TO 4
2270 READ PL(ITEM,STATE)
2280 NEXT ITEM
2290 NEXT STATE
2300 FOR N=1 TO 11
2310 R=INT(RND*11+1)
2320 IF A(R)=1 THEN 2310
2330 A(R)=1
2340 ROW=PL(1,R)
2350 COL=PL(2,R)
2360 J=PL(3,R)
2370 JJ=PL(4,R)
2380 CALL HCHAR(ROW,COL,46)
2390 FOR DELAY=1 TO 10
2400 NEXT DELAY
2410 CALL HCHAR(ROW,COL,32)
2420 CALL KEY(0,K,S)
2430 FOR DELAY=1 TO 10
2440 NEXT DELAY
2450 IF (K>48)*(K<51)THEN 2470
2460 GOTO 2380
2470 CALL SOUND(100,300,3)
2480 CALL HCHAR(23,25,K)
2490 CALL HCHAR(ROW,COL,46)
2500 FOR DELAY=1 TO 10
2510 NEXT DELAY
2520 CALL HCHAR(ROW,COL,32)
2530 CALL KEY(0,KK,S)
2540 FOR DELAY=1 TO 10
2550 NEXT DELAY
2560 IF ((KK>47)*(KK<58))THEN 2580
2570 GOTO 2490
2580 CALL HCHAR(23,26,KK)
2590 IF (K=J)*(KK=JJ)THEN 2630
```

Level 2 Games

```
2600 CALL SOUND(300,-3,2)
2610 CALL HCHAR(23,25,32,2)
2620 GOTO 2380
2630 CALL SOUND(100,300,3)
2640 FOR FLASH=1 TO 10
2650 CALL SCREEN(12+D)
2660 FOR DELAY=1 TO 30
2670 NEXT DELAY
2680 D=-D
2690 NEXT FLASH
2700 CALL HCHAR(23,25,32,2)
2710 NEXT N
2720 END
2730 DATA 3,19,49,53
2740 DATA 6,19,49,56
2750 DATA 8,17,49,57
2760 DATA 10,15,49,48
2770 DATA 14,17,49,52
2780 DATA 10,12,49,49
2790 DATA 6,12,49,55
2800 DATA 4,13,49,51
2810 DATA 9,9,50,49
2820 DATA 12,6,50,48
2830 DATA 7,6,49,50
```

Program 4. Western States

```
100 REM WESTERN STATES
110 REM
120 CALL CLEAR
130 PRINT "11 UTAH"
140 PRINT "12 TEXAS"
150 PPINT "13 IDAHO"
160 PRINT "14 NEVADA"
170 PRINT "15 KANSAS"
180 PRINT "16 OREGON"
190 PRINT "17 MONTANA"
200 PRINT "18 ARIZONA";
210 PRINT TAB(15);"24 N DAKOTA"
220 PRINT "19 WYOMING";
230 PRINT TAB(15);"25 S DAKOTA"
240 PRINT "21 NEBRASKA";
250 PRINT TAB(15);"26 CALIFORNIA"
260 PRINT "22 OKLAHOMA";
270 PRINT TAB(15);"27 NEW MEXICO"
280 PRINT "23 COLORADO";
290 PRINT TAB(15);"28 WASHINGTON"
300 PRINT
310 CALL CHAR(81,"FFFFFFFFFFFFFFFF")
320 CALL CHAR(91,"01020282C4B88080")
```

```

330 CALL HCHAR(2,12,91)
340 CALL CHAR(92,"C03C03")
350 CALL HCHAR(2,13,92)
360 CALL CHAR(93,"0000F00F")
370 CALL HCHAR(2,14,93)
380 CALL CHAR(94,"000000E09F909090")
390 CALL HCHAR(2,15,94)
400 CALL CHAR(95,"000000000000FC03")
410 CALL HCHAR(2,16,95)
420 CALL CHAR(96,"000000000000FF")
430 CALL HCHAR(2,17,96)
440 CALL CHAR(97,"00000000000000FF")
450 CALL HCHAR(2,18,97,3)
460 CALL HCHAR(2,21,96)
470 CALL CHAR(99,"000000000000FF00")
480 CALL HCHAR(2,22,99)
490 CALL CHAR(100,"00000000000000C040")
500 CALL HCHAR(2,23,100)
510 CALL CHAR(101,"0000000001010102")
520 CALL HCHAR(3,11,101)
530 CALL CHAR(102,"8080808080601010")
540 CALL HCHAR(3,12,102)
550 CALL CHAR(103,"0101010101010202")
560 CALL HCHAR(3,14,103)
570 CALL CHAR(104,"1010080804040202")
580 CALL HCHAR(3,15,104)
590 CALL CHAR(105,"2020202020202020")
600 CALL HCHAR(3,20,105)
610 CALL CHAR(106,"4040202020201010")
620 CALL HCHAR(3,23,106)
630 CALL CHAR(107,"0202040404040808")
640 CALL HCHAR(4,11,107)
650 CALL CHAR(108,"101F")
660 CALL HCHAR(4,12,108)
670 CALL CHAR(109,"00FF")
680 CALL HCHAR(4,13,109)
690 CALL CHAR(110,"02FE020101020204")
700 CALL HCHAR(4,14,110)
710 CALL CHAR(111,"0201010101010101")
720 CALL HCHAR(4,15,111)
730 CALL CHAR(112,"20202020203F2020")
740 CALL HCHAR(4,20,112)
750 CALL CHAR(113,"0000000000FF0000")
760 CALL HCHAR(4,21,113,2)
770 CALL CHAR(114,"1010101010F01010")
780 CALL HCHAR(4,23,114)
790 CALL CHAR(115,"1020202040404040")
800 CALL HCHAR(5,11,115)
810 CALL CHAR(116,"0204040404040404")
820 CALL HCHAR(5,14,116)

```

Level 2 Games

```
830 CALL CHAR(117, "8040201F")
840 CALL HCHAR(5, 16, 117)
850 CALL CHAR(118, "00007FC040404040")
860 CALL HCHAR(5, 17, 118)
870 CALL CHAR(119, "0000FF")
880 CALL HCHAR(5, 18, 119, 2)
890 CALL CHAR(120, "2020E02020202020")
900 CALL HCHAR(5, 20, 120)
910 CALL CHAR(121, "0808080808040404")
920 CALL HCHAR(5, 23, 121)
930 CALL CHAR(122, "40407F4080808080")
940 CALL HCHAR(6, 11, 122)
950 CALL CHAR(123, "0000F00F")
960 CALL HCHAR(6, 12, 123)
970 CALL CHAR(124, "000000F04F404080")
980 CALL HCHAR(6, 13, 124)
990 CALL CHAR(125, "0404040404FC0300")
1000 CALL HCHAR(6, 14, 125)
1010 CALL CHAR(126, "000000000000F00F")
1020 CALL HCHAR(6, 15, 126)
1030 CALL HCHAR(6, 16, 97)
1040 CALL CHAR(128, "40404040404040C0")
1050 CALL HCHAR(6, 17, 128)
1060 CALL CHAR(129, "202020203F202020")
1070 CALL HCHAR(6, 20, 129)
1080 CALL CHAR(130, "00000000FF")
1090 CALL HCHAR(6, 21, 130, 2)
1100 CALL CHAR(132, "04020202FE020101")
1110 CALL HCHAR(6, 23, 132)
1120 CALL CHAR(133, "8080808080808080")
1130 CALL HCHAR(7, 11, 133)
1140 CALL HCHAR(7, 13, 133)
1150 CALL CHAR(135, "0404040404040404")
1160 CALL VCHAR(7, 15, 135, 3)
1170 CALL CHAR(136, "4040404040407F00")
1180 CALL HCHAR(7, 17, 136)
1190 CALL CHAR(98, "000000000000FF80")
1200 CALL HCHAR(7, 18, 98)
1210 CALL HCHAR(7, 19, 96)
1220 CALL CHAR(139, "202020202020FF00")
1230 CALL HCHAR(7, 20, 139)
1240 CALL CHAR(140, "000000000000F020")
1250 CALL HCHAR(7, 21, 140)
1260 CALL CHAR(141, "8080404040202020")
1270 CALL HCHAR(7, 24, 141)
1280 CALL HCHAR(8, 11, 141)
1290 CALL CHAR(143, "8080808040402020")
1300 CALL HCHAR(8, 13, 143)
1310 CALL VCHAR(8, 18, 133, 2)
```

```

1320 CALL CHAR(146, "20203F2020202020")
1330 CALL HCHAR(8, 21, 146)
1340 CALL CHAR(147, "0000FF")
1350 CALL HCHAR(8, 22, 147, 2)
1360 CALL CHAR(149, "2020F01008040202")
1370 CALL HCHAR(8, 24, 149)
1380 CALL CHAR(150, "0808040402020101")
1390 CALL HCHAR(9, 11, 150)
1400 CALL CHAR(151, "2010080402010000")
1410 CALL HCHAR(9, 13, 151)
1420 CALL CHAR(152, "00000000000008040")
1430 CALL HCHAR(9, 14, 152)
1440 CALL HCHAR(9, 21, 105)
1450 CALL CHAR(34, "0201010101010101")
1460 CALL HCHAR(9, 24, 34)
1470 CALL CHAR(157, "8080808080404040")
1480 CALL HCHAR(10, 12, 157)
1490 CALL CHAR(158, "2010080402010100")
1500 CALL HCHAR(10, 14, 158)
1510 CALL CHAR(159, "0407080310204080")
1520 CALL HCHAR(10, 15, 159)
1530 CALL CHAR(127, "00FF")
1540 CALL HCHAR(10, 16, 127, 2)
1550 CALL CHAR(131, "80FF808080808080")
1560 CALL HCHAR(10, 18, 131)
1570 CALL HCHAR(10, 19, 127, 2)
1580 CALL CHAR(35, "20FF8080FF808080")
1590 CALL VCHAR(11, 21, 133, 2)
1600 CALL HCHAR(10, 21, 35)
1610 CALL CHAR(36, "00FF0000F0101010")
1620 CALL HCHAR(10, 22, 36)
1630 CALL CHAR(37, "00FF")
1640 CALL HCHAR(10, 23, 37, 2)
1650 CALL CHAR(38, "8080808040402020")
1660 CALL HCHAR(10, 25, 38)
1670 CALL CHAR(39, "20180601")
1680 CALL HCHAR(11, 12, 39)
1690 CALL CHAR(40, "0000000080402010")
1700 CALL HCHAR(11, 13, 40)
1710 CALL CHAR(41, "8040402020404040")
1720 CALL HCHAR(11, 15, 41)
1730 CALL VCHAR(11, 18, 133, 2)
1740 CALL CHAR(43, "1010101010101010F00")
1750 CALL HCHAR(11, 22, 43)
1760 CALL CHAR(44, "00000000000000FF")
1770 CALL HCHAR(11, 23, 44)
1780 CALL CHAR(45, "FF")
1790 CALL HCHAR(12, 24, 45)
1800 CALL CHAR(46, "20202020202020F0")

```

Level 2 Games

```
1810 CALL HCHAR(11,25,46)
1820 CALL CHAR(47,"0804040407000000")
1830 CALL HCHAR(12,13,47)
1840 CALL HCHAR(12,14,130)
1850 CALL CHAR(48,"4040408080C02010")
1860 CALL HCHAR(12,15,48)
1870 CALL CHAR(58,"0808040402020101")
1880 CALL HCHAR(12,25,58)
1890 CALL CHAR(60,"0C03")
1900 CALL HCHAR(13,15,60)
1910 CALL CHAR(61,"0000C0300C03")
1920 CALL HCHAR(13,16,61)
1930 CALL HCHAR(13,17,96)
1940 CALL CHAR(63,"808080809F90F000")
1950 CALL HCHAR(13,18,63)
1960 CALL CHAR(64,"00007F40C0201807")
1970 CALL HCHAR(13,19,64)
1980 CALL HCHAR(13,20,147)
1990 CALL CHAR(134,"808080")
2000 CALL HCHAR(13,21,134)
2010 CALL CHAR(137,"8080404040404040")
2020 CALL HCHAR(13,26,137)
2030 CALL CHAR(138,"8080804020101008")
2040 CALL HCHAR(14,20,138)
2050 CALL CHAR(142,"0906")
2060 CALL HCHAR(15,20,142)
2070 CALL CHAR(33,"0000000010234080")
2080 CALL HCHAR(14,21,33)
2090 CALL CHAR(144,"000000000000E060")
2100 CALL HCHAR(14,22,144)
2110 CALL CHAR(145,"2010100804040201")
2120 CALL HCHAR(15,22,145)
2130 CALL CHAR(148,"8040300C03")
2140 CALL HCHAR(16,23,148)
2150 CALL CHAR(153,"1010080808887000")
2160 CALL HCHAR(16,24,153)
2170 CALL CHAR(154,"0304040808081010")
2180 CALL HCHAR(15,24,154)
2190 CALL CHAR(155,"00090A0C10204080")
2200 CALL HCHAR(14,25,155)
2210 CALL CHAR(156,"40C")
2220 CALL HCHAR(14,26,156)
2230 RANDOMIZE
2240 D=4
2250 DIM A(17),PL(4,17)
2260 FOR STATE=1 TO 17
2270 FOR ITEM=1 TO 4
2280 READ PL(ITEM,STATE)
2290 NEXT ITEM
```

```

2300 NEXT STATE
2310 FOR N=1 TO 17
2320 R=INT(RND*17+1)
2330 IF A(R)=1 THEN 2320
2340 A(R)=1
2350 ROW=PL(1,R)
2360 COL=PL(2,R)
2370 J=PL(3,R)
2380 JJ=PL(4,R)
2390 CALL HCHAR(ROW,COL,81)
2400 FOR DELAY=1 TO 10
2410 NEXT DELAY
2420 CALL HCHAR(ROW,COL,32)
2430 CALL KEY(0,K,S)
2440 FOR DELAY=1 TO 10
2450 NEXT DELAY
2460 IF (K>48)*(K<51)THEN 2480
2470 GOTO 2390
2480 CALL SOUND(100,300,3)
2490 CALL HCHAR(24,25,K)
2500 CALL HCHAR(ROW,COL,81)
2510 FOR DELAY=1 TO 10
2520 NEXT DELAY
2530 CALL HCHAR(ROW,COL,32)
2540 CALL KEY(0,KK,S)
2550 FOR DELAY=1 TO 10
2560 NEXT DELAY
2570 IF (KK>48)*(KK<58)THEN 2590
2580 GOTO 2500
2590 CALL HCHAR(24,26,KK)
2600 IF (K=J)*(KK=JJ)THEN 2640
2610 CALL SOUND(300,-3,2)
2620 CALL HCHAR(24,25,32,2)
2630 GOTO 2390
2640 CALL SOUND(100,300,2)
2650 FOR FLASH=1 TO 10
2660 CALL SCRFN(12+D)
2670 FOR DELAY=1 TO 30
2680 NEXT DELAY
2690 D=-D
2700 NEXT FLASH
2710 CALL HCHAR(24,25,32,2)
2720 NEXT N
2730 END
2740 DATA 8,16,49,49
2750 DATA 11,16,49,56
2760 DATA 3,13,50,56
2770 DATA 3,21,50,52
2780 DATA 5,22,50,53

```

Level 2 Games

2790 DATA 13,23,49,50
2800 DATA 9,19,50,51
2810 DATA 9,22,49,53
2820 DATA 11,19,50,55
2830 DATA 6,18,49,57
2840 DATA 8,14,49,52
2850 DATA 9,12,50,54
2860 DATA 11,24,50,50
2870 DATA 5,15,49,51
2880 DATA 5,13,49,54
2890 DATA 4,19,49,55
2900 DATA 7,22,50,49

Find the Word

Skill area: Language Arts

Level: 2, 3

"Find the Word" can be played by any number of players at the same time.

When the program is run, a list of eight partially random letters is displayed on the screen. The list is not quite random in that the letters Q, V, and Z never appear, and E, A, I, and O have a greater chance of being selected than the rest of the alphabet. The object is to find as many three-letter words as possible which can be made from the eight letters.

You should have a pen and paper available. After a minute or so, the words READY, HIT ANY KEY are printed. When a key is pressed, the computer will display a list of three-letter words that it located by searching a list of 368 words in its memory.

This program is particularly good in promoting language development and reading skills.

Find the Word

```
100 REM  FIND THE WORD
110 REM
120 CALL CLEAR
130 PRINT "{8 SPACES}FIND A WORD"
140 FOR J=1 TO 10
150 PRINT
160 NEXT J
170 PRINT "{4 SPACES}PLEASE WAIT A MOMENT"
180 GOTO 670
190 DATA 1,31,32,58,59,77
200 DATA 78,95,96,108,109,130
210 DATA 131,147,148,168,169,174
220 DATA 175,185,186,189,190,206
230 DATA 207,218
240 F1=219
250 F2=230
260 RETURN
270 F1=231
280 F2=244
290 RETURN
300 F1=245
310 F2=273
```

Level 2 Games

320 RETURN
330 F1=274
340 F2=295
350 RETURN
360 F1=296
370 F2=324
380 RETURN
390 F1=325
400 F2=347
410 RETURN
420 F1=348
430 F2=348
440 RETURN
450 F1=349
460 F2=363
470 RETURN
480 F1=364
490 F2=368
500 RETURN
510 DATA ACE,ACT,ADD,ADO,AFT,AGE,AGO,AID,AIL,AIM,A
IR,ALE,ALL,AND,ANY,APE,APT,ARC,ARE,ARK,ARM,ART
,ASH,ASK,ASP,ASS
520 DATA ATE,ANT,AWE,AWL,AXE,BAD,BAG,BAN,BAR,BAT,B
AY,BED,BEE,BEG,BET,BIG,BIN,BID,BIT,BOA,BOG,BOO
,BOW,BOX,BOY,BUT
530 DATA BUM,BUN,BUY,BYE,BUG,BUD,CAB,CAD,CAM,CAN,C
AP,CAR,CAT,COB,COD,COG,COT,COW,COY,CRY,CUB,CUD
,CUE,CUP,CUT,DAB
540 DATA DAD,DAM,DEN,DEW,DIE,DIG,DIM,DIN,DIP,DOE,D
OG,DOT,DRY,DUB,DUD,DUE,DUG,EAR,EAT,EBB,EEL,EGG
550 DATA EKE,ELK,ELM,END,ERA,ERR,EWE,EYE,FAD,FAG,F
AN,FAR,FAT,FED,FEE,FEW,FIB,FIG,FIN,FIR,FIT,FIX
,FLY,FOE,FOG,FOR
560 DATA FOX,FRY,FUN,FUR,GAB,GAG,GAP,GAY,GEL,GEM,G
ET,GIG,GIN,GOB,GOD,GOO,GOT,GUM,GUN,GUT,GUY,HAD
,HAG,HAM,HAS,HAT
570 DATA HAY,HEN,HER,HEX,HEW,HID,HIM,HIP,HIS,HIT,H
OD,HOE,HOG,HOP,HOT,HOW,ICE,ILK,ILL,INK,IMP,IRE
,JAB,JAM,JAR,JAW
580 DATA JET,JIB,JIG,JOB,JOG,JOT,JOY,KEY,KID,KIN,K
IT,LAB,LAD,LAP,LAW,LAX,LED,LEG,LET
590 DATA LID,LIE,LIP,LIT,LOB,LOG,LOP,LOW,LOT,MAD,M
AN,MAP,MAR,MAT,MAY,MEN,MET,MIX,MOB,MUD,MUG,NAB
,NAG,NAP,NET,NEW
600 DATA NIP,NOD,NOG,NOT,NOW,NUN,NUT,OAF,OAR,OAK,O
AT,ODE,OFF,OIL,OLD,ONE,ORB,ORE,OUR,OUT,OWE,PAD
,PAL,PAN,PAR,PAT
610 DATA PAW,PAY,PEA,PEG,PEN,PEP,PER,PET,PEW,PIE,P
IG,PIN,PIT,PLY,POD,POP,POT,POX,PRY

Level 2 Games

```
620 DATA PUB,PUG,PUN,PUP,PUT,RAG,RAN,RAP,RAT,RAW,R
    AY,RED,RIB,RIG,RIM,RIP,ROB,ROE,ROT,ROW,RUE,RUB
    ,RUG,RUM,RUN,RUT
630 DATA RYE,SAD,SAG,SAP,SAT,SAW,SEE,SEA,SET,SEW,S
    EX,SHE,SHY,SIN,SIP,SIR,SIT,SIX,SKY,SLY,SOB,SOD
    ,SON,SOW,SOY,SPY
640 DATA STY,SUE,SUM,SUN,TAB,TAG,TAM,TAN,TAP,TAR,T
    AX,TEA,TEE,TEN,THE,TIE,TIN,TIP,TOE
650 DATA TON,TOO,TOP,TOW,TOY,TUB,TUG,TWO,URN,WAD,W
    AG,WAR,WAS,WAX,WAY,WED,WEE,WET,WHY,WIG,WIN,WIT
    ,WOE,WON,YAM,YAP
660 DATA YES,YET,YOU
670 DIM A$(368),B$(50),R(8),L$(8),LL$(8),FF1(13),F
    F2(13)
680 FOR J=1 TO 13
690 READ FF1(J),FF2(J)
700 NEXT J
710 FOR J=1 TO 368
720 READ A$(J)
730 NEXT J
740 RANDOMIZE
750 CALL CLEAR
760 FOR J=1 TO 8
770 R(J)=INT(RND*30+1)
780 IF R(J)=17 THEN 1360
790 IF R(J)=22 THEN 1380
800 IF R(J)=26 THEN 1400
810 IF R(J)=27 THEN 1420
820 IF R(J)=28 THEN 1360
830 IF R(J)=29 THEN 1380
840 IF R(J)=30 THEN 1380
850 L$(J)=CHR$(R(J)+64)
860 PRINT " ";L$(J);
870 NEXT J
880 PRINT ::
890 N=0
900 FOR J=1 TO 8
910 IF J=1 THEN 960
920 T=1
930 IF L$(T)=L$(J) THEN 1180
940 T=T+1
950 IF T<J THEN 930
960 IF R(J)=24 THEN 1180
970 IF R(J)>13 THEN 1010
980 F1=FF1(R(J))
990 F2=FF2(R(J))
1000 GOTO 1020
1010 ON R(J)-13 GOSUB 240,270,300,210,330,360,390,
    420,210,450,210,480
```

Level 2 Games

```
1020 FOR W=F1 TO F2
1030 FOR I=1 TO 8
1040 LL$(I)=L$(I)
1050 NEXT I
1060 LL$(J)="Q"
1070 X$=SEG$(A$(W),2,1)
1080 FOR I=1 TO 8
1090 IF X$=LL$(I)THEN 1120
1100 NEXT I
1110 GOTO 1170
1120 LL$(I)="Z"
1130 X$=SEG$(A$(W),3,1)
1140 FOR I=1 TO 8
1150 IF X$=LL$(I)THEN 1330
1160 NEXT I
1170 NEXT W
1180 NEXT J
1190 PRINT "READY, HIT ANY KEY"
1200 CALL KEY(0,Q,S)
1210 IF S=0 THEN 1200
1220 PRINT N
1230 FOR I=1 TO N
1240 PRINT B$(I),
1250 NEXT I
1260 PRINT
1270 PRINT "DO YOU WANT TO PLAY AGAIN?{5 SPACES}{Y
    OR N)"
1280 CALL KEY(0,Q,S)
1290 IF Q=89 THEN 750
1300 IF Q=78 THEN 1320
1310 GOTO 1280
1320 END
1330 N=N+1
1340 B$(N)=A$(W)
1350 GOTO 1170
1360 R(J)=1
1370 GOTO 850
1380 R(J)=5
1390 GOTO 850
1400 R(J)=9
1410 GOTO 850
1420 R(J)=15
1430 GOTO 850
```

Level 3 Games

Chase

Skill area: Coordination**Level: 3**

The goal of "Chase" is to teach spatial relations and map-reading skills. It is a variation of the classic maze game with an interesting twist. You manipulate an arrow through a maze with three of the arrow keys (E for straight ahead, S for a left turn, and D for a right turn).

The objective is to catch a target which is always moving. The target leaves a trail behind it, and you must follow the trail exactly. If the target gets too far ahead, you lose, and if you catch the target, you win. The arrow moves twice as fast as the target, so ordinarily, the game would be pretty simple. The twist is that you must use the orientation of the arrow to determine which key to press. In ordinary maze games, you hit the left or right arrow if you want to move the character to the left or right side of the screen. You hit the up or down arrow if you want to move to the top or bottom of the screen. That is not necessarily true in this game. If the arrow is pointing left, meaning the screen character is moving left, and you want the character to move toward the top of the screen, you must hit the D key for a right turn. An object moving left has to make a right turn to move upward, just as a car driving west has to make a right turn to head north.

Likewise, if the arrow is moving down, and you wish to move the character toward the left, you must hit the right arrow, just as a car heading south has to turn right in order to head west. To move the arrow in the direction that it is currently pointing, it is necessary to hit the up-arrow key.

The ALPHA LOCK key should be down for this program to run if you are using the arrow keys.

This game is well suited for joysticks. In order to play with the joysticks instead of the arrow keys, it is necessary to change only four lines of the program.

```
670 CALL JOYST(1,X,Y)
680 IF (X=-4)THEN 980
690 IF (Y=4)THEN 1000
700 IF (X=4)THEN 1020
```

Level 3 Games

As with any program using joysticks, the ALPHA LOCK key must be up when the program is running.

Chase

```
100 REM CHASE
110 REM
120 DIM R(2),C(2)
130 CALL CHAR(96,"FFFFFFFFFFFFFFFF")
140 CALL CHAR(104,"102040FE40201000")
150 CALL CHAR(105,"1038549210101010")
160 CALL CHAR(106,"100804FE04081000")
170 CALL CHAR(107,"1010109254381000")
180 CALL CHAR(112,"007C4444447C0000")
190 CALL CHAR(113,"0000383838000000")
200 CALL CLEAR
210 SCORE=-1
220 RESTORE
230 INPUT "DEGREE OF DIFFICULTY(1,2,{3 SPACES}OR 3
)?:":H
240 IF (H=1)+(H=2)+(H=3)THEN 270
250 PRINT :::"TRY AGAIN":::
260 GOTO 230
270 CALL CLEAR
280 CALL SCREEN(16)
290 FOR N=5 TO 27 STEP 2
300 FOR NN=3 TO 21 STEP 2
310 CALL VCHAR(NN,N,96)
320 NEXT NN
330 NEXT N
340 CALL HCHAR(1,3,96,27)
350 CALL HCHAR(23,3,96,27)
360 CALL VCHAR(1,3,96,23)
370 CALL VCHAR(1,29,96,23)
380 CALL COLOR(10,5,1)
390 CALL COLOR(11,9,1)
400 R(1)=6
410 C(1)=16
420 R(2)=8+4*H
430 C(2)=16
440 FOR J=R(1)TO R(2)
450 CALL HCHAR(J,16,113)
460 SCORE=SCORE+1
470 NEXT J
480 CALL HCHAR(R(2),16,105)
490 CALL HCHAR(R(1),16,112)
500 DIR=2
510 N=1
520 READ D
530 IF D=5 THEN 1270
```

Level 3 Games

```
540 OLDR=R(N)
550 OLDC=C(N)
560 ON D GOSUB 900,920,940,960
570 CALL SOUND(50,300,3)
580 CALL HCHAR(OLDR,OLDC,113)
590 CALL HCHAR(R(N),C(N),112)
600 SCORE=SCORE+1
610 IF SCORE>25 THEN 1120
620 FOR DELAY=1 TO 76-25*H
630 NEXT DELAY
640 N=2
650 OLDR=R(N)
660 OLDC=C(N)
670 CALL KEY(0,K,S)
680 IF (K=83)+(K=115)THEN 980
690 IF (K=69)+(K=101)THEN 1000
700 IF (K=68)+(K=100)THEN 1020
710 GOTO 510
720 D=D+DIR
730 IF D=0 THEN 1040
740 IF D=5 THEN 1060
750 ON D GOSUB 900,920,940,960
760 CALL GCHAR(R(N),C(N),G)
770 IF G<>113 THEN 870
780 CALL HCHAR(OLDR,OLDC,32)
790 CALL HCHAR(R(N),C(N),32)
800 ON D GOSUB 900,920,940,960
810 CALL SOUND(50,300,3)
820 CALL HCHAR(R(N),C(N),103+D)
830 SCORE=SCORE-2
840 IF SCORE<1 THEN 1080
850 DIR=D
860 GOTO 510
870 R(N)=OLDR
880 C(N)=OLDC
890 GOTO 510
900 C(N)=C(N)-1
910 RETURN
920 R(N)=R(N)-1
930 RETURN
940 C(N)=C(N)+1
950 RETURN
960 R(N)=R(N)+1
970 RETURN
980 D=-1
990 GOTO 720
1000 D=0
1010 GOTO 720
1020 D=1
```

Level 3 Games

```
1030 GOTO 720
1040 D=4
1050 GOTO 750
1060 D=1
1070 GOTO 750
1080 M$="YOU WIN"
1090 CALL SOUND(600,300,3)
1100 GOSUB 1290
1110 GOTO 1150
1120 CALL SOUND(600,-3,3)
1130 M$="YOU LOST"
1140 GOSUB 1290
1150 M$="AGAIN (Y OR N)?"
1160 GOSUB 1290
1170 CALL KEY(0,K,S)
1180 IF (K=89)+(K=121)THEN 200
1190 IF (K=78)+(K=110)THEN 1210
1200 GOTO 1170
1210 END
1220 DATA 1,1,4,4,1,1,2,2,2,2,3,3,3,3,3,3,4,4,3,3,
      4,4,3,3,4,4,4,4,1,1,2,2,1,1,4,4
1230 DATA 4,4,4,4,3,3,4,4,1,1,1,1,1,1,4,4,1,1,2,2,
      2,2,3,3,2,2,2,2,1,1,2,2,2,2
1240 DATA 1,1,4,4,1,1,2,2,2,2,2,2,3,3,2,2,1,1,1,1,
      1,1,4,4,3,3,4,4,1,1,4,4,4,4
1250 DATA 3,3,4,4,3,3,3,3,4,4,3,3,3,3,3,3,2,2,3,3,
      3,3,4,4,3,3,4,4,3,3,2,2,3,3,4,4
1260 DATA 3,3,2,2,2,2,1,1,2,2,3,3,2,2,1,1,1,1,4,4,
      1,1,1,1,1,1,2,2,1,1,2,2,5
1270 RESTORE
1280 GOTO 520
1290 FOR K=1 TO LEN(M$)
1300 C$=SEG$(M$,K,1)
1310 CALL HCHAR(24,7+K,ASC(C$))
1320 NEXT K
1330 FOR DELAY=1 TO 300
1340 NEXT DELAY
1350 RETURN
```

Percent Problems

Skill area: Mathematics

Level: 3

"Percent Problems" consists of 45 word problems which will review and test your ability to solve problems involving percent. It is not intended to teach the concept of percent to someone who has no understanding of it.

The problems are divided into three types. Type 1 involves finding the percent of a number (X percent of Y is what?); type 2 involves finding what percent one number is of another (X is what percent of Y?); and type 3 involves finding the whole when the percent is known (X is Y percent of what?).

Each problem is displayed on the screen, and you must enter the answer. It would be helpful if you had a pencil and paper or a calculator available for computation, although none of the problems involves complex arithmetic. You enter your answer. If the answer is correct, the program responds with THAT'S CORRECT (name), and then goes on to the next problem. If you are wrong, the program responds WRONG! TRY AGAIN, and you are given another chance. If you cannot give the correct answer after the third try, the program displays instructions on how to solve that type of problem, and then solves the problem correctly.

Percent Problems

```

100 REM  PERCENT PROBLEMS
110 REM
120 CALL CLEAR
130 PRINT TAB(3);"SOLVING PERCENT PROBLEMS":
140 INPUT "WHAT IS YOUR NAME  ":NAME$
150 FOR N=1 TO 5
160 READ P,X
170 ERROR=0
180 PRINT ::"IF THE SALES TAX RATE IS";P:"PERCENT
    , WHAT WOULD THE{5 SPACES}SALES TAX BE ON A PU
    RCHASE OF $";X;"?"
190 INPUT "$":GUESS
200 IF GUESS=X*P/100 THEN 270
210 ERROR=ERROR+1
220 IF ERROR>2 THEN 250
230 PRINT ::"WRONG! TRY AGAIN."
```

Level 3 Games

```
240 GOTO 190
250 GOSUB 1350
260 GOTO 280
270 PRINT "THAT'S CORRECT ";NAME$:::
280 READ X,Y
290 ERROR=0
300 PRINT :::"THE TOTAL ENROLLMENT AT A{3 SPACES}S
    CHOO IS";X;". TODAY THERE":"WERE";Y;"STUDENTS
    ABSENT."
310 PRINT "WHAT PERCENTAGE OF THE STU- DENTS WERE
    ABSENT?"
320 INPUT GUESS
330 IF GUESS=(Y/X)*100 THEN 400
340 ERROR=ERROR+1
350 IF ERROR>2 THEN 380
360 PRINT :::"WRONG! TRY AGAIN."
370 GOTO 320
380 GOSUB 1440
390 GOTO 410
400 PRINT "THAT'S CORRECT ";NAME$:::
410 READ X,P
420 ERROR=0
430 PRINT :::"A FAMILY BOUGHT A HOUSE.{4 SPACES}TH
    EY MADE A";P;"PERCENT DOWN":"PAYMENT. IF THE D
    OWN PAYMENT"
440 PRINT "WAS $";X;". HOW MUCH DID":"THE HOUSE CO
    ST?"::
450 INPUT " $":GUESS
460 IF GUESS=(X/P)*100 THEN 530
470 ERROR=ERROR+1
480 IF ERROR>2 THEN 510
490 PRINT :::"WRONG! TRY AGAIN."
500 GOTO 450
510 GOSUB 1550
520 GOTO 540
530 PRINT "THAT'S CORRECT ";NAME$:::
540 READ P,X
550 ERROR=0
560 PRINT :::"A SALESMAN IS PAID ON COM- MISSION.
    HE RECEIVES";P;"PERCENT OF HIS TOTAL SALES."
570 PRINT "LAST MONTH HE SOLD $";X;"WORTH OF EQUIP
    MENT. WHAT WASHIS COMMISSION?"
580 INPUT " $":GUESS
590 IF GUESS=P*X/100 THEN 660
600 ERROR=ERROR+1
610 IF ERROR>2 THEN 640
620 PRINT :::"WRONG! TRY AGAIN."
630 GOTO 580
640 GOSUB 1350
```

Level 3 Games

```
650 GOTO 670
660 PRINT : "THAT'S CORRECT "; NAME$ ::
670 READ X, Y
680 ERROR = 0
690 PRINT : : "A BANK ACCOUNT HAD $"; X; "IN IT AT THE
    BEGINNING OF {3 SPACES} THE YEAR. IT EARNED $"
    ; Y:
700 PRINT "IN INTEREST. WHAT WAS THE INTEREST RATE
    IN PERCENT?"
710 INPUT GUESS
720 IF GUESS = (Y/X) * 100 THEN 790
730 ERROR = ERROR + 1
740 IF ERROR > 2 THEN 770
750 PRINT : "WRONG! TRY AGAIN." ::
760 GOTO 710
770 GOSUB 1440
780 GOTO 800
790 PRINT : "THAT'S CORRECT "; NAME$ ::
800 READ P, X
810 PRINT : : "A TENNIS TEAM WON"; P; "PER-" : "CENT OF
    ITS GAMES THIS YEAR."
820 ERROR = 0
830 PRINT "IF THE TEAM WON"; X; "GAMES, " : "HOW MANY G
    AMES DID IT PLAY?" ::
840 INPUT GUESS
850 IF GUESS = (X/P) * 100 THEN 920
860 ERROR = ERROR + 1
870 IF ERROR > 2 THEN 900
880 PRINT : "WRONG! TRY AGAIN." :
890 GOTO 840
900 GOSUB 1550
910 GOTO 930
920 PRINT : "THAT'S CORRECT "; NAME$ ::
930 READ P, X
940 ERROR = 0
950 PRINT : : "A STUDENT GETS"; P; "PERCENT" : "OF THE
    PROBLEMS CORRECT ON A TEST. IF THERE ARE"; X:
960 PRINT "PROBLEMS ON THE TEST, HOW {3 SPACES} MANY
    DID THE STUDENT GET {4 SPACES} CORRECT?" :
970 INPUT GUESS
980 IF GUESS = (P * X) / 100 THEN 1050
990 ERROR = ERROR + 1
1000 IF ERROR > 2 THEN 1030
1010 PRINT : "WRONG! TRY AGAIN."
1020 GOTO 970
1030 GOSUB 1350
1040 GOTO 1060
1050 PRINT : "THAT'S CORRECT "; NAME$ ::
1060 READ X, Y
```

Level 3 Games

```
1070 ERROR=0
1080 PRINT :::"THE REGULAR PRICE OF AN ITEMIS $";X
      ;"BUT THE STORE TOOK"
1090 PRINT "$";Y;"OFF. WHAT PERCENT OFF WAS";"THIS
      ?"
1100 INPUT GUESS
1110 IF GUESS=(Y/X)*100 THEN 1180
1120 ERROR=ERROR+1
1130 IF ERROR>2 THEN 1160
1140 PRINT : "WRONG! TRY AGAIN."
1150 GOTO 1100
1160 GOSUB 1440
1170 GOTO 1190
1180 PRINT : "THAT'S CORRECT ";NAME$:
1190 READ P,X
1200 ERROR=0
1210 PRINT :::"A SALESMAN IS PAID ON COM- MISSION
      . HE IS PAID";P:"PERCENT OF HIS SALES. LAST"
1220 PRINT "MONTH HIS COMMISSIONS WERE $";X;". WH
      AT WAS THE VALUE"
1230 PRINT "OF HIS SALES?"
1240 INPUT " $":GUESS
1250 IF GUESS=(X/P)*100 THEN 1320
1260 ERROR=ERROR+1
1270 IF ERROR>2 THEN 1300
1280 PRINT : "WRONG! TRY AGAIN."
1290 GOTO 1240
1300 GOSUB 1550
1310 GOTO 1330
1320 PRINT : "THAT'S CORRECT ";NAME$:
1330 NEXT N
1340 END
1350 PRINT :::"THIS IS AN EXAMPLE OF A{5 SPACES}PRO
      BLEM WHICH INVOLVES{6 SPACES}FINDING A PERCENT
      OF A"
1360 PRINT "NUMBER. TO FIND THE PERCENT OF A NUMBE
      R, DIVIDE THE{5 SPACES}PERCENT BY 100 TO GET A"
1370 PRINT "DECIMAL. THEN MULTIPLY{5 SPACES}THIS
      DECIMAL TIMES THE NUM- BER. TO SOLVE THIS PRO
      BLEM"
1380 PRINT "DIVIDE";P;"BY 100 TO GET";P/100;"THEN
      MULTIPLY";P/100;"TIMES"
1390 PRINT X;"TO GET";X*P/100::
1400 PRINT "HIT ANY KEY TO CONTINUE."
1410 CALL KEY(0,K,S)
1420 IF S=0 THEN 1410
1430 RETURN
1440 PRINT :::"THIS IS AN EXAMPLE OF A{5 SPACES}PR
      OBLEM WHERE YOU NEED TO{3 SPACES}FIND OUT WHA
      T PERCENT ONE"
```



```

1450 PRINT "NUMBER IS OF ANOTHER. TO{3 SPACES}SOL
VE THIS TYPE OF PROBLEM DIVIDE THE SMALLER N
UMBER"
1460 PRINT "BY THE LARGER NUMBER TO GET A DECIMAL.
MULTIPLY THIS{4 SPACES}DECIMAL TIMES 100 TO
GET THE"
1470 PRINT "PERCENT. TO SOLVE THIS{5 SPACES}PROBL
EM, DIVIDE";Y;"BY"
1480 PRINT X;"TO GET THE DECIMAL";Y/X
1490 PRINT "THEN MULTIPLY THIS TIMES 100TO GET";(Y
/X)*100;" . THE ANSWER IS"
1500 PRINT (Y/X)*100;"PERCENT.":::
1510 PRINT "HIT ANY KEY TO CONTINUE."
1520 CALL KEY(0,K,S)
1530 IF S=0 THEN 1520
1540 RETURN
1550 PRINT :::"THIS IS AN EXAMPLE OF A{5 SPACES}PR
OBLEM WHERE YOU HAVE TO{3 SPACES}FIND A NUMBE
R WHEN A PERCENT"
1560 PRINT "OF IT IS KNOWN. TO SOLVE{4 SPACES}THIS
TYPE OF PROBLEM, "
1570 PRINT "DIVIDE THE NUMBER GIVEN BY THE PERCEN
T, AND THEN MULTI-PLY THE RESULT BY 100. TO"
1580 PRINT "SOLVE THIS PROBLEM, DIVIDE";X;"BY";P;"
TO GET";X/P;" ."
1590 PRINT "THEN MULTIPLY THIS BY 100 TOGET";(X/P)
*100;"THE ANSWER IS"
1600 PRINT (X/P)*100;".":::
1610 PRINT "HIT ANY KEY TO CONTINUE."
1620 CALL KEY(0,K,S)
1630 IF S=0 THEN 1620
1640 RETURN
1650 DATA 5,200,500,100,6000,20,10,12000,5000,500,
50,10,80,20,200,50,10,1200
1660 DATA 4,50,400,20,12000,20,5,30000,8000,400,25
,4,60,25,250,50,20,2000
1670 DATA 6,60,1000,80,7500,15,20,20000,12000,960,
60,15,95,40,800,320,15,3000
1680 DATA 7,12,640,80,8400,12,15,15000,15000,1350,
75,12,64,50,700,245,12,3000
1690 DATA 3,27,1100,66,9900,18,18,12000,21000,1470
,90,27,88,50,840,126,7,1015

```

Remember the Maze

Skill area: Memory

Level: 3

Spatial memory involves remembering the location of objects in relation to each other. How good is your spatial memory? Play "Remember the Maze" to find out.

Spatial memory can be improved with practice. When you first see the square in the center of the screen, pay close attention. Soon a row of stars will appear and zigzag around the screen ending at a dollar sign. The entire pattern remains on the screen for approximately ten seconds, and then the stars disappear, leaving only the square and the dollar sign.

The object of the game is to remember as much of the row of stars as possible while it is on the screen. Once the stars disappear, you move the square around the screen with the four arrow keys. The S key moves it to the left, the D key moves it to the right, the E key moves it up, and the X key moves it down. However, the square can only move along the path determined by the stars, and every time you try to move the square off the invisible path, there is a warning sound and the score is increased by one. The object is to reach the dollar sign after making as few errors as possible.

When the end of the path is reached, the screen flashes, and you're asked whether you want to play again. If the answer is yes, you can either play the same maze again or try a different maze.

The ALPHA LOCK key must be down (on) for this program to work properly.

Remember the Maze

```
100 REM  REMEMBER THE MAZE
110 REM
120 DIM A(10)
130 RANDOMIZE
140 CALL CHAR(128,"007E7E7E7E7E7E00")
150 M=INT(RND*10+1)
160 IF A(M)=1 THEN 150
170 A(M)=1
```

Level 3 Games

```
180 N=N+1
190 R=12
200 C=14
210 SCORE=0
220 SC=0
230 CALL SCREEN(16)
240 CALL COLOR(13,9,1)
250 CALL COLOR(2,9,1)
260 CALL CLEAR
270 CALL HCHAR(R,C,128)
280 ON M GOSUB 860,1030,1200,1370,1520,1670,1840,2
    000,2170,2350
290 FOR I=1 TO 3000
300 NEXT I
310 CALL COLOR(2,1,1)
320 RR=R
330 CC=C
340 CALL KEY(0,K,S)
350 IF K=68 THEN 580
360 IF K=69 THEN 600
370 IF K=83 THEN 620
380 IF K=88 THEN 640
390 IF S=0 THEN 340
400 CALL SOUND(300,-3,5)
410 GOTO 340
420 CALL GCHAR(R,C,G)
430 IF G=42 THEN 560
440 IF G=36 THEN 660
450 R=RR
460 C=CC
470 CALL SOUND(300,300,3)
480 SCORE=SCORE+1
490 IF SCORE=10 THEN 520
500 CALL HCHAR(23,28,SCORE+48)
510 GOTO 340
520 SCORE=0
530 SC=SC+1
540 CALL HCHAR(23,27,SC+48)
550 GOTO 500
560 CALL HCHAR(R,C,128)
570 GOTO 320
580 C=C+1
590 GOTO 420
600 R=R-1
610 GOTO 420
620 C=C-1
630 GOTO 420
640 R=R+1
650 GOTO 420
```

Level 3 Games

```
660 CALL SOUND(1000,500,3)
670 D=4
680 FOR I=1 TO 9
690 CALL SCREEN(12+D)
700 FOR DELAY=1 TO 20
710 NEXT DELAY
720 D=-D
730 NEXT I
740 IF N>9 THEN 850
750 PRINT "AGAIN (Y OR N)?"
760 CALL KEY(0,K,S)
770 IF K=89 THEN 800
780 IF K=78 THEN 850
790 GOTO 760
800 PRINT "SAME MAZE OR DIFFERENT MAZE (S OR D)?"
810 CALL KEY(0,K,S)
820 IF K=83 THEN 190
830 IF K=68 THEN 150
840 GOTO 810
850 END
860 REM MAZE ONE
870 CALL VCHAR(3,14,42,9)
880 CALL HCHAR(3,14,42,13)
890 CALL VCHAR(3,26,42,6)
900 CALL HCHAR(8,17,42,10)
910 CALL VCHAR(8,17,42,14)
920 CALL HCHAR(21,17,42,3)
930 CALL VCHAR(21,19,42,3)
940 CALL HCHAR(23,9,42,11)
950 CALL VCHAR(11,9,42,12)
960 CALL HCHAR(11,5,42,5)
970 CALL VCHAR(6,5,42,6)
980 CALL HCHAR(6,5,42,7)
990 CALL VCHAR(6,11,42,13)
1000 CALL HCHAR(18,11,42,3)
1010 CALL HCHAR(18,14,36)
1020 RETURN
1030 REM MAZE TWO
1040 CALL HCHAR(12,15,42,10)
1050 CALL VCHAR(12,24,42,4)
1060 CALL HCHAR(15,8,42,17)
1070 CALL VCHAR(8,8,42,8)
1080 CALL HCHAR(8,8,42,12)
1090 CALL HCHAR(7,19,42,6)
1100 CALL VCHAR(5,24,42,3)
1110 CALL HCHAR(5,17,42,8)
1120 CALL VCHAR(3,17,42,3)
1130 CALL HCHAR(3,3,42,15)
1140 CALL VCHAR(3,3,42,18)
```

Level 3 Games

```
1150 CALL HCHAR(20,3,42,5)
1160 CALL VCHAR(20,7,42,3)
1170 CALL HCHAR(22,7,42,7)
1180 CALL HCHAR(22,14,36)
1190 RETURN
1200 REM MAZE THREE
1210 CALL VCHAR(6,14,42,6)
1220 CALL HCHAR(6,11,42,4)
1230 CALL VCHAR(6,11,42,10)
1240 CALL HCHAR(15,9,42,3)
1250 CALL VCHAR(4,9,42,12)
1260 CALL HCHAR(4,5,42,5)
1270 CALL VCHAR(4,5,42,14)
1280 CALL HCHAR(17,5,42,17)
1290 CALL VCHAR(13,21,42,5)
1300 CALL HCHAR(13,21,42,5)
1310 CALL VCHAR(13,25,42,7)
1320 CALL HCHAR(19,19,42,7)
1330 CALL VCHAR(19,19,42,3)
1340 CALL HCHAR(21,15,42,5)
1350 CALL HCHAR(21,14,36)
1360 RETURN
1370 REM MAZE FOUR
1380 CALL HCHAR(12,12,42,2)
1390 CALL VCHAR(12,12,42,12)
1400 CALL HCHAR(23,6,42,7)
1410 CALL VCHAR(10,6,42,14)
1420 CALL VCHAR(5,7,42,6)
1430 CALL HCHAR(5,7,42,20)
1440 CALL VCHAR(5,26,42,5)
1450 CALL HCHAR(9,18,42,9)
1460 CALL VCHAR(9,18,42,4)
1470 CALL HCHAR(12,18,42,10)
1480 CALL VCHAR(12,27,42,11)
1490 CALL HCHAR(22,15,42,13)
1500 CALL HCHAR(22,14,36)
1510 RETURN
1520 REM MAZE FIVE
1530 CALL VCHAR(13,14,42,7)
1540 CALL HCHAR(19,14,42,15)
1550 CALL VCHAR(15,28,42,5)
1560 CALL HCHAR(15,22,42,7)
1570 CALL VCHAR(15,22,42,3)
1580 CALL HCHAR(17,20,42,3)
1590 CALL VCHAR(5,20,42,13)
1600 CALL HCHAR(5,5,42,16)
1610 CALL VCHAR(5,5,42,12)
1620 CALL HCHAR(17,5,42,5)
1630 CALL VCHAR(17,9,42,6)
```

Level 3 Games

```
1640 CALL HCHAR(22,9,42,5)
1650 CALL HCHAR(22,14,36)
1660 RETURN
1670 REM MAZE SIX
1680 CALL HCHAR(12,15,42,7)
1690 CALL VCHAR(8,21,42,5)
1700 CALL HCHAR(8,8,42,14)
1710 CALL VCHAR(8,8,42,11)
1720 CALL HCHAR(18,8,42,10)
1730 CALL VCHAR(18,17,42,4)
1740 CALL HCHAR(21,17,42,6)
1750 CALL VCHAR(17,23,42,5)
1760 CALL HCHAR(17,23,42,4)
1770 CALL VCHAR(5,26,42,13)
1780 CALL HCHAR(5,5,42,22)
1790 CALL VCHAR(5,5,42,10)
1800 CALL VCHAR(14,6,42,9)
1810 CALL HCHAR(22,6,42,8)
1820 CALL HCHAR(22,14,36)
1830 RETURN
1840 REM MAZE SEVEN
1850 CALL VCHAR(7,14,42,5)
1860 CALL HCHAR(7,14,42,4)
1870 CALL VCHAR(7,17,42,6)
1880 CALL HCHAR(12,17,42,4)
1890 CALL VCHAR(5,21,42,8)
1900 CALL HCHAR(5,10,42,12)
1910 CALL VCHAR(5,10,42,8)
1920 CALL HCHAR(12,8,42,3)
1930 CALL VCHAR(8,8,42,5)
1940 CALL HCHAR(8,4,42,5)
1950 CALL VCHAR(8,4,42,11)
1960 CALL HCHAR(18,4,42,11)
1970 CALL VCHAR(18,14,42,4)
1980 CALL HCHAR(22,14,36)
1990 RETURN
2000 REM MAZE EIGHT
2010 CALL HCHAR(12,12,42,2)
2020 CALL VCHAR(12,12,42,4)
2030 CALL HCHAR(15,8,42,5)
2040 CALL HCHAR(16,6,42,3)
2050 CALL VCHAR(6,6,42,11)
2060 CALL HCHAR(6,6,42,12)
2070 CALL VCHAR(6,17,42,3)
2080 CALL HCHAR(9,17,42,4)
2090 CALL VCHAR(9,20,42,5)
2100 CALL HCHAR(14,20,42,6)
2110 CALL VCHAR(14,25,42,5)
2120 CALL HCHAR(18,19,42,7)
```

2130 CALL VCHAR(18,19,42,4)
2140 CALL HCHAR(21,14,42,6)
2150 CALL HCHAR(22,14,36)
2160 RETURN
2170 REM MAZE NINE
2180 CALL VCHAR(13,14,42,3)
2190 CALL HCHAR(15,8,42,7)
2200 CALL VCHAR(10,8,42,6)
2210 CALL HCHAR(10,8,42,13)
2220 CALL VCHAR(10,20,42,8)
2230 CALL HCHAR(17,20,42,6)
2240 CALL VCHAR(3,25,42,15)
2250 CALL HCHAR(3,12,42,13)
2260 CALL HCHAR(4,4,42,9)
2270 CALL VCHAR(4,4,42,17)
2280 CALL HCHAR(20,4,42,4)
2290 CALL VCHAR(18,8,42,3)
2300 CALL HCHAR(18,8,42,4)
2310 CALL VCHAR(18,11,42,5)
2320 CALL HCHAR(22,11,42,3)
2330 CALL HCHAR(22,14,36)
2340 RETURN
2350 REM MAZE 10
2360 CALL HCHAR(12,15,42,7)
2370 CALL VCHAR(12,21,42,4)
2380 CALL HCHAR(15,10,42,12)
2390 CALL VCHAR(9,10,42,6)
2400 CALL HCHAR(9,10,42,14)
2410 CALL VCHAR(9,23,42,10)
2420 CALL HCHAR(18,23,42,3)
2430 CALL VCHAR(18,25,42,3)
2440 CALL HCHAR(21,18,42,8)
2450 CALL HCHAR(22,15,42,4)
2460 CALL HCHAR(22,14,36)
2470 RETURN

Scramble

Skill area: Language Arts

Level: 3

In this two-player game, a scrambled word is shown on the screen, and the players race to unscramble it. For example, the computer might show the following letters:

ELTERT

These unscramble to make the word "letter." Each of the two players is assigned a key; one has the Q key and one has the P key. After the scrambled letters are shown, whoever presses their key first gets to enter the correct word. You have about 16 seconds in which to do this. If the correct word is typed in and the ENTER key hit before time runs out, you get five points. There is a clock running at the top of the screen, and if the clock gets to 120 before you have entered the correct word, you lose five points. You also lose five points if the wrong word is entered. After the word is typed in, it is important to hit the ENTER key before the time is up.

The score for each player is shown on every round. There are 100 words in the program.

Computers can only do one thing at a time, and as a result, since the clock is running while you are entering the word, sometimes it is necessary to hold a key down for a moment before the letter appears on the screen. If you type in the wrong letter or hold a key down too long so that a letter appears twice by mistake, it is possible to erase one or more letters that have been typed in with the zero key.

The program contains only six-letter words. This list is of moderate difficulty for most adults and older children. For younger children, a list of five-letter words might be more appropriate. If you wish, you can substitute the following list for the list of words in the DATA statements in the program.

If one or more of the players are extremely slow typists, the 16-second time limit may not be long enough. It is possible to extend the limit by changing the 2 in the equation ($WW = 2$) in line 770 to a higher number (up to 9).

If a scrambled word has been on the screen for 30 seconds

and neither of the two players has hit their key, the program shows what the correct answer was and goes to the next word.

The ALPHA LOCK key must be down (on) for this program to work.

Five-Letter Words

CATCH	PRICE	SINCE	RAPID
STORM	OTHER	OWNER	HUMAN
PRESS	FIRST	LEAST	TOWER
WOMAN	GROUP	WRITE	ABOUT
BLACK	SOUND	HABIT	DOZEN
WHITE	WOULD	ALONE	STUDY
EARLY	FUNNY	CLOSE	FIELD
WHICH	PLACE	TOUCH	MAJOR
UNDER	MONTH	POINT	SMOKE
QUICK	STYLE	SHAKE	CHILD
HEAVY	MIGHT	GIANT	EXTRA
COVER	POWER	SNEAK	FLASH
STORE	EIGHT	WORRY	TRUST
STORY	PLANT	LOVER	CROSS
ATTIC	FEVER	SHINE	BASIC
MUSIC	TOUGH	GROUP	ENJOY
TRAIN	CRACK	WORLD	AMUSE
ADULT	VISIT	CABIN	SEVEN
LEARN	WRONG	THIRD	ABOUT
HOUSE	PRIME	WHALE	ENTER
DRINK	HOTEL	YOUNG	ABUSE
FOUND	BUILD	COURT	ORDER
LOCAL	AVOID	WATER	APPLE
MATCH	BEGIN	PARTY	ARGUE
FORCE	HAPPY	SWORD	FENCE

Scramble

```
100 REM SCRAMBLE
110 REM
120 CALL CLEAR
130 DIM A$(100),B(100),NAME$(2),SCORE(2),C(12),ANS
    $(12)
140 INPUT "PLAYER ONE ":NAME$(1)
150 INPUT "PLAYER TWO ":NAME$(2)
160 PRINT ":NAME$(1);"'S KEY IS Q":
170 PRINT NAME$(2);"'S KEY IS P":
180 RANDOMIZE
```

Level 3 Games

```
190 FOR N=1 TO 100
200 READ A$(N)
210 NEXT N
220 FOR M=1 TO 100
230 CALL CLEAR
240 V=1
250 P=1
260 PRINT NAME$(1);"'S SCORE IS";SCORE(1):
270 PRINT NAME$(2);"'S SCORE IS";SCORE(2)::::::::::
280 R=INT(RND*100+1)
290 IF B(R)=1 THEN 280
300 B(R)=1
310 PRINT TAB(10);
320 L=LEN(A$(R))
330 FOR N=1 TO L
340 T=INT(RND*L+1)
350 IF C(T)=1 THEN 340
360 C(T)=1
370 PRINT SEG$(A$(R),T,1);
380 NEXT N
390 PRINT :::
400 CALL KEY(0,K,S)
410 IF K=81 THEN 700
420 IF K=80 THEN 720
430 P=P+1
440 IF P=500 THEN 950
450 GOTO 400
460 PRINT TAB(3);NAME$(J);"'S 'TURN':::
470 W=0
480 WW=0
490 WWW=0
500 W=W+1
510 IF W=10 THEN 750
520 CALL HCHAR(5,27,W+48)
530 CALL KEY(0,K,S)
540 IF K=13 THEN 580
550 IF (K>64)*(K<91)THEN 850
560 IF K=48 THEN 890
570 GOTO 500
580 FOR N=1 TO L
590 IF ANS$(N)<>SEG$(A$(R),N,1)THEN 940
600 NEXT N
610 SCORE(J)=SCORE(J)+5
620 FOR N=1 TO 12
630 C(N)=0
640 NEXT N
650 PRINT :::"HIT ANY KEY TO CONTINUE."::
660 CALL KEY(0,K,S)
670 IF S=0 THEN 660
680 NEXT M
```

```
690 END
700 J=1
710 GOTO 730
720 J=2
730 CALL SOUND(50,200,3)
740 GOTO 460
750 W=0
760 WW=WW+1
770 IF (WW=2)*(WWW=1) THEN 940
780 IF WW=10 THEN 810
790 CALL HCHAR(5,26,WW+48)
800 GOTO 520
810 WW=0
820 WWW=1
830 CALL HCHAR(5,25,49)
840 GOTO 790
850 ANS$(V)=CHR$(K)
860 CALL HCHAR(23,11+V,K)
870 V=V+1
880 GOTO 500
890 V=V-1
900 IF V>0 THEN 920
910 V=1
920 CALL HCHAR(23,11+V,32)
930 GOTO 500
940 SCORE(J)=SCORE(J)-5
950 CALL SOUND(600,-3,3)
960 PRINT TAB(10);A$(R)
970 GOTO 620
980 DATA NATION,IGNORE,PENCIL,MONKEY,DIVIDE,CATTLE
,ENTIRE,SINGLE,DECIDE,AFFAIR
990 DATA STRONG,MATTER,SENIOR,JUNIOR,HEAVEN,TRAVEL
,PEOPLE,RESULT,AGENCY,WONDER
1000 DATA SECOND,LOCATE,FLIGHT,REASON,PLEASE,SECRE
T,PRINCE,INSIDE,ENERGY,FUTURE
1010 DATA ELEVEN,CARPET,CHOICE,BATTLE,THROAT,REALL
Y,PERIOD,EMPIRE,POLICE,INVENT
1020 DATA CLEVER,RATHER,ORIGIN,ISLAND,BEAUTY,INFOR
M,FLOWER,RECORD,MOMENT,ESCAPE
1030 DATA ALWAYS,DOUBLE,MODERN,REFUSE,EXPERT,HANDL
E,NUMBER,ATTEND,TWENTY,RETURN
1040 DATA REPAIR,HEALTH,PARENT,FIGURE,SOCIAL,OFFIC
E,AROUND,FAMILY,AUTHOR,DOCTOR
1050 DATA CHANGE,CHARGE,BRIGHT,DAMAGE,WEIGHT,LAWYE
R,ACROSS,MOTHER,FATHER,CUSTOM
1060 DATA POLISH,EFFORT,SHRINK,TONGUE,SYMBOL,SYSTE
M,BEHIND,CORNER,COFFEE,VIOLIN
1070 DATA CAMERA,REMOTE,FOLLOW,LITTLE,STRING,CANNO
T,BECOME,REMOVE,DEVICE,SUFFIX
```

Depth Charges

Skill area: Logic

Level: 3

As captain of an anti-submarine vessel, you know that somewhere beneath your ship is an enemy submarine. You have to destroy the submarine with depth charges. The problem is that you have only a limited number of depth charges remaining, so you must aim carefully.

The only information you have is that when you drop a depth charge, the ship's computer tells you how much you missed the submarine by.

"Depth Charges" has two levels of difficulty. With level 1, you are playing in two-dimensional space, and you set your coordinates with a letter from A to I and a digit from 1 to 9. Thus, there are 81 possible places where the submarine might be.

The grid on the screen will show you where you have fired. To fire a depth charge, first type in a letter, then a number. You will hear the sound of the depth charge exploding, and the computer will show you how far off you were. The amount that you missed by is determined by the coordinate that you were furthest away on. If you fired at C 7 and the submarine was at H 6, you would be told that you missed by 5. If you fired at C 7 and the submarine was at A 2, you would also be told that you missed by 5. The number that you missed by will be shown in the cell in the grid that you fired at. At this level of difficulty, you have a total of six depth charges. If you fail to hit the submarine with six depth charges, the computer will show you where the submarine is located and will ask if you wish to play again.

Level 2 is the same as level 1 except that the game is played in three dimensions. Unfortunately, it is impossible to show a three-dimensional grid on a two-dimensional screen, so that grid is of limited use here. In level 2, you have to enter three coordinates for your depth charge: a letter between A and I and two numbers between 1 and 9. Thus there are 729 possible locations where the submarine might be. A record of each depth charge and its distance from the target is shown on the right side of the screen. In this case you have nine depth charges.

Depth Charges

```

100 REM  DEPTH CHARGES
110 REM
120 CALL CLEAR
130 RANDOMIZE
140 DIM X(3),Y(3)
150 INPUT "DIFFICULTY LEVEL(1 OR 2)":L
160 IF (L=1)+(L=2)THEN 190
170 PRINT "TRY AGAIN."
180 GOTO 150
190 L=L+1
200 CALL CLEAR
210 CALL CHAR(97,"FF")
220 CALL CHAR(98,"8080808080808080")
230 CALL CHAR(99,"FF80808080808080")
240 PRINT TAB(24);"LEVEL"
250 PRINT TAB(25);L-1::::::::::::::::::
260 PRINT TAB(22);"DEPTH"
270 PRINT TAB(21);"CHARGES"
280 PRINT TAB(20);"REMAINING"
290 FOR M=1 TO 9
300 FOR N=1 TO 9
310 CALL HCHAR(2*M,3+2*N,99)
320 CALL HCHAR(1+2*M,3+2*N,98)
330 CALL HCHAR(2*M,4+2*N,97)
340 NEXT N
350 CALL HCHAR(1,4+2*M,64+M)
360 CALL HCHAR(1+2*M,4,48+M)
370 NEXT M
380 CALL HCHAR(20,5,97,18)
390 CALL VCHAR(2,23,98,18)
400 FOR N=1 TO L
410 X(N)=INT(RND*9+1)
420 NEXT N
430 DC=3*L
440 CALL HCHAR(24,26,48+DC)
450 M$="READY"
460 GOSUB 1280
470 CALL KEY(0,Y(1),S)
480 IF (Y(1)>64)*(Y(1)<74)THEN 500
490 GOTO 470
500 CALL SOUND(50,300,3)
510 CALL HCHAR(23,11,Y(1))
520 CALL KEY(0,Y(2),S)
530 IF (Y(2)>48)*(Y(2)<58)THEN 550
540 GOTO 520
550 CALL SOUND(50,300,3)
560 CALL HCHAR(23,13,Y(2))
570 FOR DELAY=1 TO 200

```

Level 3 Games

```
580 NEXT DELAY
590 IF L=2 THEN 650
600 CALL KEY(0,Y(3),S)
610 IF (Y(3)>48)*(Y(3)<58)THEN 630
620 GOTO 600
630 CALL SOUND(50,300,3)
640 CALL HCHAR(23,15,Y(3))
650 FOR DELAY=1 TO 300
660 NEXT DELAY
670 CALL SOUND(700,-6,3)
680 D=0
690 Y(1)=Y(1)-16
700 FOR N=1 TO L
710 DD=ABS(X(N)-(Y(N)-48))
720 IF DD<D THEN 740
730 D=DD
740 NEXT N
750 IF D=0 THEN 930
760 M$="YOU MISSED BY"
770 GOSUB 1280
780 CALL HCHAR(23,19,D+48)
790 Y(1)=Y(1)+16
800 CALL HCHAR(1+2*(Y(2)-48),4+2*(Y(1)-64),D+48)
810 FOR N=1 TO L
820 CALL HCHAR(15-DC,24+N,Y(N))
830 NEXT N
840 CALL HCHAR(15-DC,29,D+48)
850 DC=DC-1
860 CALL HCHAR(24,26,48+DC)
870 IF DC=0 THEN 1030
880 FOR DELAY=1 TO 600
890 NEXT DELAY
900 CALL HCHAR(23,5,32,15)
910 CALL HCHAR(24,5,32,15)
920 GOTO 440
930 CALL HCHAR(23,5,32,15)
940 Y(1)=Y(1)+16
950 CALL HCHAR(1+2*(Y(2)-48),4+2*(Y(1)-64),42)
960 CALL HCHAR(23,5,72)
970 CALL HCHAR(23,6,73)
980 CALL HCHAR(23,7,84)
990 CALL SOUND(400,300,3)
1000 FOR DELAY=1 TO 500
1010 NEXT DELAY
1020 GOTO 1080
1030 CALL SOUND(500,-3,3)
1040 CALL HCHAR(17,25,64+X(1))
1050 CALL HCHAR(17,26,48+X(2))
1060 IF L=2 THEN 1080
```

```
1070 CALL HCHAR(17,27,48+X(3))
1080 CALL HCHAR(23,5,32,15)
1090 CALL HCHAR(24,5,32,15)
1100 M$="AGAIN (Y OR N)?"
1110 GOSUB 1280
1120 CALL KEY(0,K,S)
1130 IF K=89 THEN 1160
1140 IF K=78 THEN 1260
1150 GOTO 1120
1160 FOR M=3 TO 19 STEP 2
1170 FOR N=6 TO 22 STEP 2
1180 CALL HCHAR(M,N,32)
1190 NEXT N
1200 NEXT M
1210 FOR N=25 TO 29
1220 CALL VCHAR(6,N,32,14)
1230 NEXT N
1240 CALL HCHAR(23,5,32,15)
1250 GOTO 400
1260 CALL CLEAR
1270 END
1280 FOR P=1 TO LEN(M$)
1290 S$=SEG$(M$,P,1)
1300 CALL HCHAR(23,4+P,ASC(S$))
1310 NEXT P
1320 RETURN
```

Air Traffic Controller

Skill area: Memory**Level: 3**

You are the air traffic controller for a busy airport. As flights arrive, you must assign them to a holding pattern until a runway is free. Holding patterns are numbered 1 to 8. When a runway is free, you must specify both the flight and the holding pattern where the flight is waiting in order to land the plane. Flights should be landed in the order that they arrive, because airlines and passengers get upset if planes have to wait too long.

Your objective is to score as few demerits as possible. There are three ways in which you can score demerits:

- Leaving flights in holding patterns longer than necessary.
- Assigning an incoming flight to a holding pattern which already has another flight assigned to it, or
- Forgetting which holding pattern a flight is in.

You designate flights by the name of the airline. There are eight airlines which serve your airport: AIRTRAVEL, AMER-AIR, SOUTH, AIREAST, TIAIR, PRONTO, CTR and NJAIR. However, at any particular time, one airline can have more than one flight waiting to land.

This game requires concentration and a good memory. Initially, all of the holding patterns are empty, and it is easy to keep track of which flights are assigned where. Over time, flights arrive faster than they can be landed, and they build up so that eventually you must keep track of four or five different flights at the same time. Then, as the day ends, no more flights arrive, and you simply have to land the flights that are waiting — *if* you can remember where you assigned them.

The ALPHA LOCK key must be down (on) for this program to run properly.

Air Traffic Controller

100 REM AIR TRAFFIC CONTROLLER

Level 3 Games

```
120 CALL CLEAR
130 PRINT " AIR TRAFFIC CONTROLLER":::
140 PRINT "YOU ARE THE AIR TRAFFIC{5 SPACES}CONTRO
    LLER FOR A BUSY AIR-  PORT. AS FLIGHTS ARRIVE,
    "
150 PRINT "YOU MUST ASSIGN THEM TO A{3 SPACES}HOLD
    ING PATTERN UNTIL A RUN-WAY IS FREE.  HOLDING
    PAT-"
160 PRINT "TERNS ARE NUMBERED 1 TO 8.  WHEN A RUNW
    AY IS FREE, YOU  MUST SPECIFY BOTH THE FLIGHT"
170 PRINT "AND THE HOLDING PATTERN IN  ORDER TO LA
    ND A PLANE.":
180 PRINT "PRESS ANY KEY FOR MORE IN-  STRUCTIONS.
    "
190 CALL KEY(0,K,S)
200 IF S=0 THEN 190
210 PRINT :::"FLIGHTS SHOULD BE LANDED IN THE ORDE
    R THAT THEY ARRIVE."
220 PRINT "YOUR GOAL IS TO SCORE AS{4 SPACES}FEW D
    EMERITS AS POSSIBLE.{3 SPACES}YOU SCORE DEMERI
    TS BY LEAV-"
230 PRINT "ING FLIGHTS IN HOLDING PAT-  TERNS FOR L
    ONG PERIODS, BY  ASSIGNING INCOMING FLIGHTS"
240 PRINT "TO HOLDING PATTERNS WHICH{3 SPACES}ALRE
    ADY HAVE FLIGHTS IN THEM"
250 PRINT "OR BY FORGETTING WHERE A{4 SPACES}FLIGH
    T IS.  THE AIRLINES"
260 PRINT "THAT SERVE YOUR AIRPORT ARE AIRTRAVEL,
    AMER-AIR, SOUTH, AIREAST, TIAIR, CTR, NJAIR,"
270 PRINT "AND PRONTO. MAKE SURE THAT  YOU SPELL T
    HESE CORRECTLY.":
280 PRINT "HIT ANY KEY TO BEGIN."
290 CALL KEY(0,K,S)
300 R=RND
310 IF S=0 THEN 290
320 CALL CLEAR
330 DIM A(8),A$(8)
340 RANDOMIZE
350 FOR Q=1 TO 8
360 A$(Q)="EMPTY"
370 A(Q)=0
380 NEXT Q
390 SCORE=0
400 COUNT=0
410 R=INT(RND*8)+1
420 ON R GOSUB 1000,1020,1040,1060,1080,1100,1120,
    1140
430 PRINT :::"A FLIGHT FROM ";B$
```

Level 3 Games

```
440 PRINT "IS APPROACHING. WHICH HOLD- ING PATTERN
    DO YOU WANT TO ASSIGN IT TO?"
450 INPUT C
460 IF (C>0)*(C<9)THEN 490
470 PRINT "NO SUCH PATTERN. TRY AGAIN."
480 GOTO 450
490 IF A$(C)="EMPTY" THEN 510
500 GOTO 970
510 A$(C)=B$
520 A(C)=0
530 COUNT=COUNT+1
540 IF INT(COUNT/3)=COUNT/3 THEN 410
550 PRINT :::"A RUNWAY IS CLEAR. WHICH{4 SPACES}FL
    IGH T DO YOU WISH TO LAND?"
560 INPUT D$
570 IF D$="AIRTRAVEL" THEN 670
580 IF D$="AMER-AIR" THEN 670
590 IF D$="AIREAST" THEN 670
600 IF D$="TIAIR" THEN 670
610 IF D$="CTR" THEN 670
620 IF D$="SOUTH" THEN 670
630 IF D$="NJAIR" THEN 670
640 IF D$="PRONTO" THEN 670
650 PRINT :::"THERE IS NO SUCH FLIGHT.{4 SPACES}TR
    Y AGAIN."
660 GOTO 560
670 PRINT :::"WHICH HOLDING PATTERN IS IT IN?"
680 INPUT E
690 IF (E>0)*(E<9)THEN 720
700 PRINT "NO SUCH PATTERN. TRY AGAIN."
710 GOTO 680
720 IF A$(E)=D$ THEN 800
730 IF A$(E)="EMPTY" THEN 770
740 PRINT :::"HOLDING PATTERN";E;"HAS A{3 SPACES}F
    LIGHT FROM ";A$(E)
750 SCORE=SCORE+10
760 GOTO 550
770 PRINT :::"THERE IS NO FLIGHT IN HOLD- ING PATT
    ERN";E
780 SCORE=SCORE+10
790 GOTO 550
800 PRINT :::"THE FLIGHT FROM ";A$(E):"HAS LANDED.
    "
810 FOR K=1 TO A(E)
820 SCORE=SCORE+K
830 NEXT K
840 A(E)=0
850 A$(E)="EMPTY"
860 FOR Q=1 TO 8
```

Level 3 Games

```
870 A(Q)=A(Q)+1
880 IF A(Q)<6 THEN 920
890 IF A$(Q)="EMPTY" THEN 920
900 PRINT :: "THE FLIGHT FROM ";A$(Q): "HAS BEEN IN
    A HOLDING PAT- TERN FOR A LONG TIME AND"
910 PRINT "THE PILOT IS COMPLAINING."
920 NEXT Q
930 T=T+1
940 IF T>16 THEN 1160
950 IF COUNT>16 THEN 550
960 GOTO 410
970 PRINT :: "LOOK OUT. YOU ALMOST CAUSED A CRASH.
    HOLDING PATTERN";C: "ALREADY HAS A FLIGHT FROM"
    :A$(C)
980 SCORE=SCORE+10
990 GOTO 430
1000 B$="AMER-AIR"
1010 RETURN
1020 B$="SOUTH"
1030 RETURN
1040 B$="AIREAST"
1050 RETURN
1060 B$="AIRTRAVEL"
1070 RETURN
1080 B$="TIAIR"
1090 RETURN
1100 B$="CTR"
1110 RETURN
1120 B$="PRONTO"
1130 RETURN
1140 B$="NJAIR"
1150 RETURN
1160 SCORE=SCORE-90
1170 CALL CLEAR
1180 PRINT "YOU EARNED";SCORE;"DEMERITS.":::
1190 END
```

Car Dealer

Skill area: Strategy
Level: 3

Whether you remain in the automobile selling business or not depends on how much money you make over an eight-month period. You sell five kinds of cars: compact, mid-size, full-size, luxury, and sports cars. The following table shows the cost and selling price of each type of car.

	Cost	Price
Compact Cars	\$ 5600	\$ 6000
Mid-size Cars	6600	7000
Full-size Cars	7500	8000
Luxury Cars	10300	11000
Sports Cars	11000	12000

In a typical month, you can expect to sell about 20 cars if you have the appropriate cars in stock. You can order as many cars as you want, but you must pay 2 percent interest a month on the cost of all unsold cars in stock. The exact number of customers that you will have each month and the types of cars that they will want will vary widely, but in general, the less expensive the car, the more you will sell.

You will have to share half of the profit on each car with the salesperson who sold it.

One way that you can increase sales is by advertising. Advertising will cost \$600 per month, but it should increase your sales by about three cars a month.

In a good month, you should have a net profit of about \$3000.

Car Dealer

```
100 REM CAR DEALER
110 REM
120 CALL CLEAR
130 PRINT TAB(8); "CAR DEALER":
140 PRINT "YOU ARE A CAR DEALER WHO{4 SPACES}SELLS
    FIVE TYPES OF CARS."
150 PRINT "COMPACT CARS, MIDSIZE CARS, FULLSIZE CA
    RS, LUXURY CARS, AND SPORTS CARS."
```

Level 3 Games

```
160 PRINT "THE FOLLOWING TABLE SHOWS{3 SPACES}THE
    COST AND SELLING PRICE  OF EACH TYPE OF CAR.":
:
170 PRINT TAB(15); "COST"; TAB(21); "PRICE"

180 PRINT "COMPACT CARS"; TAB(15); "5600"; TAB(22); "6
    000"
190 PRINT "MIDSIZE CARS"; TAB(15); "6600"; TAB(22); "7
    000"
200 PRINT "FULLSIZE CARS"; TAB(15); "7500"; TAB(22); "8
    000"
210 PRINT "LUXURY CARS"; TAB(14); "10300"; TAB(21); "1
    1000"
220 PRINT "SPORTS CARS"; TAB(14); "11000"; TAB(21); "1
    2000"
230 PRINT : "HIT ANY KEY FOR MORE{8 SPACES}INSTRUCT
    IONS."
240 CALL KEY(0,K,S)
250 IF S=0 THEN 240
260 PRINT :: "IN A TYPICAL MONTH, YOU CAN  EXPECT T
    O SELL ABOUT 20{5 SPACES}CARS. YOU CAN ORDER A
    S MANY"
270 PRINT "CARS AS YOU WISH TO HAVE IN STOCK, BUT
    YOU MUST PAY 2%  INTEREST A MONTH ON THE COST"
280 PRINT "OF ALL UNSOLD CARS FOR THAT"
290 PRINT "MONTH. GENERALLY, THE LESS  EXPENSIVE T
    HE CAR, THE MORE YOU WILL SELL."
300 PRINT "YOU HAVE TO SHARE HALF OF{3 SPACES}THE
    PROFIT ON EACH CAR WITH THE SALESPERSON WHO SO
    LD IT"
310 PRINT "IF YOU WISH TO ADVERTISE,{3 SPACES}IT W
    ILL COST YOU $600 FOR{3 SPACES}EACH MONTH, BUT
    YOU SHOULD"
320 PRINT "SELL ABOUT THREE MORE CARS  EACH MONTH
    THAT YOU ADVERT- ISE."
330 PRINT "HIT ANY KEY TO BEGIN."
340 CALL KEY(0,K,S)
350 IF S=0 THEN 340
360 CALL CLEAR
370 RANDOMIZE
380 FOR MONTH=1 TO 8
390 CALL CLEAR
400 Z=27
410 PRINT TAB(10); "MONTH"; MONTH::
420 ON MONTH GOSUB 1610,1610,1580,1620,1610,1580,1
    620,1610
430 PRINT TAB(9); "INVENTORY":
440 PRINT TAB(2); "COMPACT CARS"; TAB(19); COMPACT
450 PRINT TAB(2); "MIDSIZE CARS"; TAB(19); MIDSIZE
```

Level 3 Games

```
460 PRINT TAB(2);"FULLSIZE CARS";TAB(19);FULLSIZE
470 PRINT TAB(2);"LUXURY CARS";TAB(19);LUXURY
480 PRINT TAB(2);"SPORTS CARS";TAB(19);SPORTS::
490 ADV=0
500 PRINT "DO YOU WISH TO ADVERTISE{4 SPACES}THIS
      MONTH (Y OR N)?"
510 CALL KEY(0,K,Q)
520 IF (K=89)+(K=121)THEN 1720
530 IF (K=78)+(K=110)THEN 550
540 GO TO 510
550 PRINT ::"HOW MANY CARS OF EACH TYPE DO YOU WI
      SH TO ORDER?":
560 INPUT "COMPACT CARS ":C
570 INPUT "MIDSIZE CARS ":M
580 INPUT "FULLSIZE CARS ":F
590 INPUT "LUXURY CARS ":L
600 INPUT "SPORTS CARS ":S
610 COMPACT=COMPACT+C
620 MIDSIZE=MIDSIZE+M
630 FULLSIZE=FULLSIZE+F
640 LUXURY=LUXURY+L
650 SPORTS=SPORTS+S
660 OWED=OWED+5600*C+6600*M+7500*F+10300*L+11000*S
670 FOR I=1 TO Z
680 R=INT(RND*20)+1
690 IF R=1 THEN 1230
700 IF R<4 THEN 1300
710 IF R<7 THEN 1370
720 IF R<11 THEN 1440
730 IF R<16 THEN 1510
740 NEXT I
750 CUST=CBUYER+MBUYER+FBUYER+LBUYER+SBUYER
760 PRINT : "YOU SOLD";CUST;"CARS THIS "
770 PRINT "MONTH. THE FOLLOWING CARS{3 SPACES}WERE
      SOLD:"
780 PRINT TAB(2);"COMPACT CARS";TAB(19);CBUYER
790 PRINT TAB(2);"MIDSIZE CARS";TAB(19);MBUYER
800 PRINT TAB(2);"FULLSIZE CARS";TAB(19);FBUYER
810 PRINT TAB(2);"LUXURY CARS";TAB(19);LBUYER
820 PRINT TAB(2);"SPORTS CARS";TAB(19);SBUYER::
830 MISSED=NC+NM+NF+NL+NS
840 PRINT "YOU MISSED THE FOLLOWING{4 SPACES}SALES
      BECAUSE YOU DIDN'T{4 SPACES}HAVE CARS IN STOC
      K:"
850 PRINT TAB(2);"COMPACT CARS";TAB(19);NC
860 PRINT TAB(2);"MIDSIZE CARS";TAB(19);NM
870 PRINT TAB(2);"FULLSIZE CARS";TAB(19);NF
880 PRINT TAB(2);"LUXURY CARS";TAB(19);NL
890 PRINT TAB(2);"SPORTS CARS";TAB(19);NS
```

Level 3 Games

```
900 PRINT
910 NS=0
920 NL=0
930 NF=0
940 NM=0
950 NC=0
960 P=200*CBUYER+200*MBUYER+250*FBUYER+350*LBUYER+
    500*SBUYER
970 PRINT : "HIT ANY KEY TO CONTINUE."
980 CALL KEY(0,K,STATUS)
990 IF STATUS=0 THEN 980
1000 PRINT : "THIS MONTH GROSS PROFIT WAS $";P*2;"
    BUT YOUR INTEREST"
1010 PRINT "WAS $";INT(.02*OWED);"AND YOU"
1020 PRINT "HAD TO PAY $";P;"TO YOUR"
1030 PRINT "SALES STAFF."
1040 IF ADV=600 THEN 1750
1050 PRINT "YOUR NET PROFIT FOR THE{5 SPACES}MONTH
    WAS $";P-ADV-INT(.02*OWED)
1060 NET=NET+P-ADV-INT(.02*OWED)
1070 OWED=INT(1.02*OWED)
1080 SBUYER=0
1090 LBUYER=0
1100 FBUYER=0
1110 MBUYER=0
1120 CBUYER=0
1130 PRINT : "HIT ANY KEY TO CONTINUE."
1140 CALL KEY(0,K,STATUS)
1150 IF STATUS=0 THEN 1140
1160 NEXT MONTH
1170 PRINT : "NET PROFIT WAS $";NET::
1180 IF NET>27000 THEN 1660
1190 IF NET>22500 THEN 1680
1200 IF NET>18000 THEN 1700
1210 PRINT "YOUR PERFORMANCE WAS POOR!"
1220 END
1230 IF SPORTS=0 THEN 1280
1240 SPORTS=SPORTS-1
1250 SBUYER=SBUYER+1
1260 OWED=OWED-11000
1270 GOTO 740
1280 NS=NS+1
1290 GOTO 740
1300 IF LUXURY=0 THEN 1350
1310 LUXURY=LUXURY-1
1320 LBUYER=LBUYER+1
1330 OWED=OWED-10300
1340 GOTO 740
1350 NL=NL+1
```

Level 3 Games

```
1360 GOTO 740
1370 IF FULLSIZE=0 THEN 1420
1380 FULLSIZE=FULLSIZE-1
1390 FBUYER=FBUYER+1
1400 OWED=OWED-7500
1410 GOTO 740
1420 NF=NF+1
1430 GOTO 740
1440 IF MIDSIZE=0 THEN 1490
1450 MIDSIZE=MIDSIZE-1
1460 MBUYER=MBUYER+1
1470 OWED=OWED-6600
1480 GOTO 740
1490 NM=NM+1
1500 GOTO 740
1510 IF COMPACT=0 THEN 1560
1520 COMPACT=COMPACT-1
1530 CBUYER=CBUYER+1
1540 OWED=OWED-5600
1550 GOTO 740
1560 NC=NC+1
1570 GOTO 740
1580 PRINT "THIS MONTH YOU CAN EXPECT{3 SPACES}TO
      SELL ABOUT 5 MORE CARS{3 SPACES}THAN USUAL."
1590 PRINT
1600 Z=33
1610 RETURN
1620 PRINT "THIS MONTH YOU CAN EXPECT{3 SPACES}TO
      SELL ABOUT FIVE FEWER{4 SPACES}CARS THAN USUA
      L."
1630 PRINT
1640 Z=20
1650 RETURN
1660 PRINT "AN EXCELLENT PERFORMANCE!"
1670 END
1680 PRINT "YOUR PERFORMANCE WAS GOOD!"
1690 END
1700 PRINT "ONLY A FAIR PERFORMANCE!"
1710 END
1720 Z=Z+4
1730 ADV=600
1740 GOTO 550
1750 PRINT "IN ADDITION, ADVERTISING{4 SPACES}COST
      YOU $600."
1760 GOTO 1050
```


Blackjack

Skill area: Strategy

Level: 3

“Blackjack” is an extremely popular casino card game in which the dealer plays against one or more players. In this version of Blackjack, the computer is the dealer and up to four players can play.

The object of the game is to have a hand in which the point total is higher than that of the dealer, but not greater than 21. In computing the value of a hand, each number card is worth that number, each face card is worth ten, and an ace can be counted as either one or eleven.

You are initially dealt two cards. The dealer is also dealt two cards, but only one of them is shown. You look at your two cards, and then make one of several decisions. The usual choices are to “hit,” in which you take another card, or to “stand,” in which you accept the hand as it is. You may continue to ask for hits as often as you want. However, if the value of the hand exceeds 21, then you have “busted” and have lost the hand. Once you stand, your turn is over.

The term blackjack refers to a two-card hand which totals exactly 21, an ace and a card which is worth ten. If you are dealt blackjack, you immediately receive one-and-a-half times your bet (unless the dealer also has blackjack). If the dealer’s up card is either an ace or a ten, the dealer checks the other card immediately to determine if the hand is a blackjack. If the dealer (the computer) has blackjack, it immediately wins all bets except for those in which you or another player also has blackjack.

When you have only two cards, you have another option, called doubling down. When you double down, the bet is doubled, and you receive one and only one card. It is a good strategy to double down with a hand where the two cards together total ten or eleven, because the most likely card that you will receive is a ten or a face card.

If your first two cards are the same, you can split them into two hands. Each of the two hands then receives a second card, and each of the two hands is then played exactly like any other hand (except that blackjack only pays even money, and splitting or doubling down is not permitted). You must bet the same

Level 3 Games

amount on the second hand that you bet on the first one.

After all of the players have played their hands, the dealer reveals its second card and then plays the hand. The dealer must always hit if its hand totals 16 or less and must always stand if the hand totals 17 or more. After the dealer is through playing, each hand is compared to the dealer's. If the dealer's total is greater than yours, the dealer wins and you lose the bet. If your total is greater than that of the dealer (but not more than 21), you win, and the dealer pays you an amount equal to your bet. A tie is called a push, and neither wins. If the dealer busts (takes a hit which makes the total of the hand greater than 21) all players win except those who have already busted. In these cases the dealer wins.

The program initially asks how many players there are, and then asks for the name of each. Then it asks how many decks of cards the dealer should play with. This can be any number between 1 and 6. The number of decks can be important, because certain blackjack players are able to keep track of the cards that have been played so far, and adjust their strategy accordingly. Whenever the number of remaining cards is low, the dealer shuffles, and players who are keeping track of what has been played must start counting all over again.

Each player starts with a stake of \$1000. At the beginning of each hand, the program asks you how much you want to bet on that hand. There is a maximum bet of \$500, and, of course, you cannot bet more than your stake.

Once each player has bet, the hand begins. First, the dealer's up card is shown. Then, if the dealer's hand is not blackjack, the first two cards of the first player's hand are shown. If you wish to stand, press the zero key; to hit, press the one key; to double down, you should press the two key; and to split, press the three key. Splitting is only permitted if your two cards are the same, and pressing the three key will have no effect if splitting is not permitted.

If you hit, a third card is shown. If you bust, your hand disappears. Otherwise, you must again choose between hitting and standing. You may hit as often as you wish as long as the value of your hand is not more than 21, but once you stand, your turn is over, and the name and first two cards of the next player are shown.

Once you have indicated your intention to split your hand the second card will disappear; it will reappear when you finish playing your first hand. Playing of split hands differs only slightly

from regular play — splitting your hand a second time and doubling down are not permitted and the payoff for blackjack is reduced to even money.

After all of the players have played their hands, the dealer plays. The computer automatically determines the winners and losers of each hand and adjusts the stakes of the players accordingly. If a player's stake is zero or less, they are out of the game.

If the dealer's first two cards are a blackjack, both cards are immediately displayed, and the program then displays the first two cards of each player's hand. Players are not given a choice here, since all players have lost unless their hand is also a blackjack, in which case, the hand is a push.

Blackjack

```
100 REM  BLACKJACK
110 REM
120 CALL CLEAR
130 CALL SCREEN(12)
140 PRINT TAB(10);"BLACKJACK":::
150 PRINT "  THIS GAME FOLLOWS STANDARDCASINO RULE
    S FOR BLACKJACK."
160 PRINT "  TO HIT, USE THE 1 KEY; TO STAND USE T
    HE 0 (ZERO) KEY, TO DOUBLE, USE THE 2 KEY;"
170 PRINT "AND TO SPLIT, USE THE 3 KEY."
180 PRINT : "HIT ANY KEY TO BEGIN."
190 CALL KEY(0,K,S)
200 IF S=0 THEN 190
210 CALL CLEAR
220 RANDOMIZE
230 CALL CHAR(128,"00000103070F1F3F")
240 CALL CHAR(129,"00000080C0E0F0F8")
250 CALL CHAR(130,"7F3F1F0F07030100")
260 CALL CHAR(131,"FCF8F0E0C0800000")
270 CALL CHAR(132,"0000000C1E3F3F3F")
280 CALL CHAR(133,"00000060F0F8F8F8")
290 CALL CHAR(134,"3F1F0F0703010000")
300 CALL CHAR(135,"F8F0E0C080000000")
310 CALL CHAR(136,"000103070F1F3F3F")
320 CALL CHAR(137,"000080C0E0F0F8F8")
330 CALL CHAR(138,"3F3F3D1901010300")
340 CALL CHAR(139,"F8F8783000008000")
350 CALL CHAR(140,"0003070F0F070319")
360 CALL CHAR(141,"0080C0E0E0C08030")
370 CALL CHAR(142,"3D7F7F3D19010300")
380 CALL CHAR(143,"78FCFC7C30008000")
390 CALL COLOR(13,9,1)
400 INPUT "HOW MANY PLAYERS?":N
```

Level 3 Games

```
410 IF N>4 THEN 1450
420 DIM BET(5),NAME$(5),STAKE(5),HAND(11),ACES(11)
    ,CARD(52),SPLIT(11)
430 FOR I=1 TO N
440 PRINT "NAME OF PLAYER";I;
450 INPUT NAME$(I)
460 IF LEN(NAME$(I))>7 THEN 2530
470 STAKE(I)=1000
480 PRINT
490 NEXT I
500 INPUT "NUMBER OF DECKS?":D
510 IF D>6 THEN 2550
520 REM ROUND BEGINS
530 CALL CLEAR
540 FOR I=1 TO N
550 PRINT NAME$(I);"'S STAKE IS $";STAKE(I)
560 PRINT
570 NEXT I
580 PRINT "HIT ANY KEY TO PLAY.{8 SPACES}HIT CLEAR
    TO END."
590 CALL KEY(0,K,S)
600 X=RND
610 IF S=0 THEN 590
620 CALL CLEAR
630 FOR I=1 TO N
640 PRINT NAME$(I);"'S BET? ";
650 INPUT "$":BET(I)
660 IF (BET(I)<0)+(BET(I)>500)THEN 3350
670 IF BET(I)>STAKE(I)THEN 3350
680 PRINT
690 NEXT I
700 FOR I=1 TO 500
710 NEXT I
720 CALL CLEAR
730 PRINT "DEALER"
740 COL=11
750 ROW=22
760 GOSUB 1470
770 IF WORTH=11 THEN 1990
780 HAND(11)=HAND(11)+WORTH
790 DLR2=1
800 GOSUB 1470
810 DLR2=0
820 DV=V
830 DVV=VV
840 DSUIT=SUIT
850 HAND(11)=HAND(11)+WORTH
860 IF WORTH=11 THEN 1970
870 IF HAND(11)=21 THEN 2630
```

Level 3 Games

```
880 PRINT ::
890 FOR I=1 TO N
900 PRINT NAME$(I)
910 COL=11
920 ROW=22
930 GOSUB 1470
940 HAND(I)=HAND(I)+WORTH
950 V1=V
960 IF WORTH=11 THEN 2010
970 COL=COL+3
980 GOSUB 1470
990 HAND(I)=HAND(I)+WORTH
1000 IF (HAND(I)=21)*(COL=14) THEN 2460
1010 IF WORTH=11 THEN 1950
1020 IF HAND(I)>21 THEN 2030
1030 CALL KEY(0,K,S)
1040 IF K=48 THEN 1090
1050 IF K=49 THEN 970
1060 IF K=50 THEN 2320
1070 IF K=51 THEN 2790
1080 GOTO 1030
1090 PRINT ::
1100 IF SPLITMODE=1 THEN 2940
1110 NEXT I
1120 ROW=20-N*3-ADDROW
1130 COL=14
1140 V=DV
1150 VV=DVV
1160 SUIT=DSUIT
1170 GOSUB 1690
1180 GOTO 1230
1190 COL=COL+3
1200 GOSUB 1470
1210 HAND(11)=HAND(11)+WORTH
1220 IF WORTH=11 THEN 2140
1230 IF HAND(11)<17 THEN 1190
1240 IF HAND(11)>21 THEN 2160
1250 FOR I=1 TO N
1260 IF HAND(11)>HAND(I) THEN 2220
1270 IF HAND(11)<HAND(I) THEN 2240
1280 IF SPLIT(I)=1 THEN 3280
1290 NEXT I
1300 FOR I=1 TO 11
1310 HAND(I)=0
1320 ACES(I)=0
1330 SPLIT(I)=0
1340 NEXT I
1350 ADDROW=0
1360 FOR I=1 TO N
```

Level 3 Games

```
1370 IF STAKE(I)<=0 THEN 3370
1380 NEXT I
1390 PRINT "HIT ANY KEY TO CONTINUE."
1400 CALL KEY(0,K,S)
1410 IF S=0 THEN 1400
1420 IF P>D*52-5*N THEN 2260
1430 IF P>D*52-15 THEN 2260
1440 GOTO 520
1450 PRINT "TOO MANY PLAYERS. NO MORE{3 SPACES}THA
      N FOUR CAN PLAY."
1460 GO TO 400
1470 REM ROUTINE TO PICK NEXT CARD.
1480 X=INT(RND*52+1)
1490 IF CARD(X)>=D THEN 1480
1500 CARD(X)=CARD(X)+1
1510 P=P+1
1520 VV=32
1530 IF X<14 THEN 1590
1540 IF X<27 THEN 1620
1550 IF X<40 THEN 1650
1560 Y=X-39
1570 SUIT=4
1580 GOTO 1670
1590 Y=X
1600 SUIT=1
1610 GOTO 1670
1620 Y=X-13
1630 SUIT=2
1640 GOTO 1670
1650 Y=X-26
1660 SUIT=3
1670 ON Y GOSUB 1760,1790,1820,1850,1880,1920,1920
      ,1920,1920,1920,1920,1920
1680 IF DLR2=1 THEN 1750
1690 CALL HCHAR(ROW,COL,V)
1700 CALL HCHAR(ROW,COL+1,VV)
1710 CALL HCHAR(ROW+1,COL,124+SUIT*4)
1720 CALL HCHAR(ROW+1,COL+1,125+SUIT*4)
1730 CALL HCHAR(ROW+2,COL,126+SUIT*4)
1740 CALL HCHAR(ROW+2,COL+1,127+SUIT*4)
1750 RETURN
1760 V=65
1770 WORTH=11
1780 RETURN
1790 V=75
1800 WORTH=10
1810 RETURN
1820 V=81
1830 WORTH=10
```

```
1840 RETURN
1850 V=74
1860 WORTH=10
1870 RETURN
1880 V=49
1890 VV=48
1900 WORTH=10
1910 RETURN
1920 V=63-Y
1930 WORTH=15-Y
1940 RETURN
1950 ACES(I)=ACES(I)+1
1960 GOTO 1020
1970 ACES(11)=ACES(11)+1
1980 GOTO 870
1990 ACES(11)=ACES(11)+1
2000 GOTO 780
2010 ACES(I)=ACES(I)+1
2020 GOTO 970
2030 IF ACES(I)>0 THEN 2110
2040 FOR J=1 TO 500
2050 NEXT J
2060 FOR J=22 TO 24
2070 CALL HCHAR(J,11,32,20)
2080 NEXT J
2090 HAND(I)=0
2100 GOTO 1090
2110 HAND(I)=HAND(I)-10
2120 ACES(I)=ACES(I)-1
2130 GOTO 1030
2140 ACES(11)=ACES(11)+1
2150 GOTO 1230
2160 IF ACES(11)>0 THEN 2190
2170 HAND(11)=1
2180 GOTO 1250
2190 HAND(11)=HAND(11)-10
2200 ACES(11)=ACES(11)-1
2210 GOTO 1230
2220 STAKE(I)=STAKE(I)-BET(I)
2230 GOTO 1280
2240 STAKE(I)=STAKE(I)+BET(I)
2250 GOTO 1280
2260 PRINT "SHUFFLING"
2270 FOR I=1 TO 52
2280 CARD(I)=0
2290 NEXT I
2300 P=0
2310 GOTO 520
2320 IF COL>14 THEN 1030
```

Level 3 Games

```
2330 IF SPLITMODE=1 THEN 1030
2340 BET(I)=BET(I)*2
2350 CALL HCHAR(22,23,68)
2360 CALL HCHAR(22,24,66)
2370 CALL HCHAR(22,25,76)
2380 COL=COL+3
2390 GOSUB 1470
2400 HAND(I)=HAND(I)+WORTH
2410 IF WORTH=11 THEN 2440
2420 IF HAND(I)>21 THEN 2590
2430 GOTO 1090
2440 ACES(I)=ACES(I)+1
2450 GOTO 2420
2460 IF SPLITMODE=1 THEN 1010
2470 BET(I)=1.5*(BET(I))
2480 PRINT TAB(9);"BLACKJACK"
2490 CALL SOUND(500,400,2)
2500 HAND(I)=50
2510 PRINT
2520 GOTO 1100
2530 PRINT "SORRY! NAMES CAN'T HAVE MORETHAN SEVEN
      LETTERS. TRY{5 SPACES}AGAIN."
2540 GOTO 440
2550 PRINT
2560 PRINT "SORRY, THERE MUST BE{8 SPACES}BETWEEN
      ONE AND SIX DECKS. TRY AGAIN."
2570 PRINT
2580 GOTO 500
2590 IF ACES(I)>0 THEN 2610
2600 GOTO 2040
2610 HAND(I)=HAND(I)-10
2620 GOTO 1090
2630 COL=COL+3
2640 GOSUB 1690
2650 PRINT TAB(9);"BLACKJACK"
2660 PRINT
2670 FOR I=1 TO N
2680 PRINT NAME$(I)
2690 COL=11
2700 ROW=22
2710 GOSUB 1470
2720 HAND(I)=HAND(I)+WORTH
2730 COL=COL+3
2740 GOSUB 1470
2750 HAND(I)=HAND(I)+WORTH
2760 PRINT ::
2770 NEXT I
2780 GOTO 1250
2790 IF COL<>14 THEN 1030
```

Level 3 Games

```
2800 IF V1<>V THEN 1030
2810 IF SPLITMODE=1 THEN 1030
2820 TEMPV=V
2830 TEMPVV=VV
2840 TEMPSUIT=SUIT
2850 TEMPWORTH=WORTH
2860 IF V=65 THEN 3480
2870 HAND(I)=HAND(I)-WORTH
2880 CALL VCHAR(22,14,32,3)
2890 CALL VCHAR(22,15,32,3)
2900 SPLITMODE=1
2910 SPLIT(I)=1
2920 ADDROW=ADDROW+3
2930 GOTO 980
2940 SPLITMODE=0
2950 PRINT NAME$(I)
2960 COL=11
2970 V=TEMPV
2980 VV=TEMPVV
2990 SUIT=TEMPSUIT
3000 WORTH=TEMPWORTH
3010 GOSUB 1690
3020 GOTO 3040
3030 GOSUB 1470
3040 HAND(I+5)=HAND(I+5)+WORTH
3050 IF WORTH=11 THEN 3130
3060 COL=COL+3
3070 IF HAND(5+I)>21 THEN 3150
3080 IF COL=14 THEN 3030
3090 CALL KEY(0,K,S)
3100 IF K=48 THEN 1090
3110 IF K=49 THEN 3030
3120 GOTO 3090
3130 ACES(5+I)=ACES(5+I)+1
3140 GOTO 3060
3150 IF ACES(5+I)>0 THEN 3230
3160 FOR J=1 TO 500
3170 NEXT J
3180 FOR J=22 TO 24
3190 CALL HCHAR(J,11,32,20)
3200 NEXT J
3210 HAND(5+I)=0
3220 GOTO 1090
3230 HAND(I+5)=HAND(I+5)-10
3240 ACES(I+5)=ACES(I+5)-1
3250 GOTO 3090
3260 HAND(I+5)=HAND(I+5)-10
3270 GOTO 1090
3280 IF HAND(11)>HAND(I+5) THEN 3310
```

Level 3 Games

```
3290 IF HAND(11)<HAND(I+5)THEN 3330
3300 GOTO 1290
3310 STAKE(I)=STAKE(I)-BET(I)
3320 GOTO 1290
3330 STAKE(I)=STAKE(I)+BET(I)
3340 GOTO 1290
3350 PRINT "INELIGIBLE BET. TRY AGAIN."
3360 GOTO 650
3370 PRINT NAME$(I); " IS BROKE."
3380 M=N-I
3390 IF M=0 THEN 3440
3400 FOR J=1 TO M
3410 NAME$(I-1+J)=NAME$(I+J)
3420 STAKE(I-1+J)=STAKE(I+J)
3430 NEXT J
3440 N=N-1
3450 IF N=0 THEN 3470
3460 GOTO 1380
3470 END
3480 HAND(I)=22
3490 ACES(5+I)=1
3500 GOTO 2870
```

Investments

Skill area: Strategy**Level: 3**

You have just inherited \$50,000 from your rich uncle, but one of the stipulations of the will was that you could not spend any of the money for six years. You plan to invest this money as wisely as possible so that in six years, when you have access to the money, you will have as much as possible.

There are six types of investments available to you:

1. The Alpha Steel Company — This is a large steel manufacturing company whose profits seem to rise and fall with the economy. It is currently selling at \$50 per share and is paying a dividend of \$3 per share.
2. Moonbeam Oil — This is a medium-sized firm that drills for oil and gas. Its profits depend primarily on how lucky it is in finding oil or gas. If they have a big strike, owners of this stock could do very well. It is currently selling at \$40 a share and is paying a dividend of \$1.20 a share.
3. Omega Computers — This is a small, high-tech firm that manufactures components for microcomputers. This is a new firm, so there is more risk involved. It is not presently paying a dividend.
4. Long-term bonds — Long-term bonds are now paying a coupon rate of \$90 for a \$1000 bond, which amounts to an interest rate of 9 percent. If interest rates go up, the value of these bonds decreases; if interest rates go down, the value of these bonds increases.
5. Gold — Gold pays no interest or dividends, but is an excellent hedge against inflation.
6. The Beta Cash Reserves — This is a money market fund. The interest rate that it pays changes depending on short-term interest rates in general. There is no risk of losing your investment.

Any money which is not invested is automatically placed in your bank account, which pays 5 percent interest.

The value of these investments over the six-year period is determined by the Gross National Product (GNP), which is an indicator of the overall health of the economy, the inflation rate,

Level 3 Games

and interest rates. Interest rates tend to rise and fall with the inflation rate. There is a random factor to consider as well.

Occasionally economists will make predictions about the economic conditions for next year. As in the real world, their predictions are sometimes wrong.

On each of the six rounds, corresponding to the six years, you will have the choice of buying as much of each of these as you can afford, or selling whatever you own, depending on market conditions.

A word of advice: Buy low, sell high.

Investments

```
100 REM INVESTMENTS
110 REM
120 CALL CLEAR
130 RANDOMIZE
140 PRINT TAB(10);"INVESTMENTS":
150 PRINT " YOU HAVE JUST INHERITED{3 SPACES}$50,
      000, BUT YOU CAN'T SPEND ANY OF THE MONEY FOR SIX
      YEARS. YOUR GOAL IS TO INVEST YOUR MONEY TO MAXIMIZE YOUR RETURN OVER A SIX YEAR"
160 PRINT "PERIOD. YOU HAVE SIX POS-{3 SPACES}SIBLE INVESTMENTS.":
170 PRINT "1. THE ALPHA STEEL COMPANY: THIS IS A LARGE STEEL MANUFACTURING COMPANY. IT PAYS"
180 PRINT "A DIVIDEND OF $3.00 A SHARE.":
190 PRINT "2. MOONBEAM OIL: THIS IS A MEDIUM SIZE FIRM WHICH{6 SPACES}DRILLS FOR OIL AND NATURAL"
200 PRINT "GAS. IT PAYS A DIVIDEND OF $1.20 A SHARE.":
210 PRINT "HIT ANY KEY TO CONTINUE."
220 CALL KEY(0,K,S)
230 R=RND
240 IF S=0 THEN 230
250 PRINT :::::"3. OMEGA COMPUTER COMPANY: THIS IS A SMALL HIGH TECH{3 SPACES}COMPANY WHICH MAKES MICRO"
260 PRINT "COMPUTER COMPONENTS. IT IS NOT PAYING A DIVIDEND NOW.":
270 PRINT "4. LONG TERM BONDS: THESE{3 SPACES}ARE NOW PAYING $90 PER YEAR WHICH IS A CURRENT RETURN"
280 PRINT "RATE OF 9%. HOWEVER, IF{4 SPACES}INTEREST RATES GO DOWN,"
290 PRINT "THESE INCREASE IN VALUE, AND IF INTEREST RATES GO UP,{4 SPACES}THESE LOSE VALUE.":
```

```
310 PRINT "5. GOLD: THIS PAYS NO DIVI- DEND OR INT
    EREST BUT IS A{3 SPACES}GOOD HEDGE AGAINST INF
    LATION":
320 PRINT "HIT ANY KEY TO CONTINUE."
330 CALL KEY(0,K,S)
340 IF S=0 THEN 330
350 PRINT ::::"6. BETA CASH RESERVES: A
    {4 SPACES}MONEY MARKET FUND WHOSE INT-EREST RA
    TES CHANGE DAILY.":
360 PRINT ::"ANY MONEY NOT INVESTED IS"
370 PRINT "AUTOMATICALLY PUT IN YOUR{3 SPACES}BANK
    ACCOUNT WHICH PAYS 5% INTEREST."
380 PRINT "HIT ANY KEY TO CONTINUE.":
390 CALL KEY(0,K,S)
400 IF S=0 THEN 390
410 DIM WORTH(6),NAME$(6),P$(6),Q$(6),OWNED(6),OLD
    PRICE(5)
420 FOR N=1 TO 6
430 READ NAME$(N),WORTH(N),P$(N),Q$(N)
440 OWNED(N)=0
450 NEXT N
460 DATA ALPHA STEEL,50,A SHARE,SHARES
470 DATA MOONBEAM OIL,40,A SHARE,SHARES
480 DATA OMEGA COMPUTER,30,A SHARE,SHARES
490 DATA A LONG TERM BOND,1000,,BONDS
500 DATA GOLD,400,AN OUNCE,OUNCES
510 DATA BETA CASH RESERVES,1,A SHARE,SHARES
520 BANK=50000
530 FOR YEAR=1 TO 6
540 CALL CLEAR
550 PRINT "THERE IS NOW $";BANK;"IN":"YOUR BANK AC
    COUNT.":
560 FOR N=1 TO 6
570 IF OWNED(N)=0 THEN 700
580 PRINT ::NAME$(N);" IS SELLING"
590 PRINT "AT $";WORTH(N);P$(N):
600 PRINT "YOU NOW OWN";OWNED(N);Q$(N):
610 PRINT "HOW MANY ";Q$(N);" DO YOU":"WANT TO SEL
    L?"
620 INPUT SELL
630 IF SELL<1 THEN 700
640 IF SELL>OWNED(N)THEN 680
650 OWNED(N)=OWNED(N)-SELL
660 BANK=BANK+INT(SELL*WORTH(N))
670 GOTO 700
680 PRINT "TRY AGAIN."
690 GOTO 600
700 NEXT N
710 FOR N=1 TO 6
```

Level 3 Games

```
720 PRINT :NAME$(N); " IS NOW SELLING": "AT $"; WORTH
    H(N); P$(N); ". HOW MANY": Q$(N); " DO YOU WISH TO
    BUY. "
730 INPUT BUY
740 IF BUY*WORTH(N)>BANK THEN 780
750 OWNED(N)=OWNED(N)+BUY
760 BANK=BANK-BUY*WORTH(N)
770 GOTO 800
780 PRINT "YOU CAN'T AFFORD THAT MANY. TRY AGAIN."
790 GOTO 720
800 NEXT N
810 IF BANK=0 THEN 830
820 PRINT "THERE IS $"; BANK; "IN YOUR BANK ACCOUNT.
    ":
830 X=INT(RND*11-3)+A
840 IF X<0 THEN 880
850 IF X>0 THEN 900
860 PRINT : "THERE WAS NO CHANGE IN THE GNP THIS
    YEAR. "
870 GOTO 910
880 PRINT : "THE GNP WAS DOWN"; -X; "%": "THIS YEAR."
890 GOTO 910
900 PRINT : "THE GNP WAS UP"; X; "%": "THIS YEAR."
910 Y=X+INT(RND*5+1)+B-A
920 IF Y>1 THEN 940
930 Y=1
940 PRINT : "THE INFLATION RATE WAS"; Y; "%": "THIS YE
    AR. "
950 Z=Y+INT(RND*6-1)
960 IF Z>3 THEN 980
970 Z=4
980 PRINT : "THE INTEREST RATE PAID ON{3 SPACES}MON
    EY MARKET FUNDS WAS "; Z; "%": "THIS YEAR. "
990 FOR N=1 TO 5
1000 OLDPRICE(N)=WORTH(N)
1010 NEXT N
1020 WORTH(1)=INT(WORTH(1)+WORTH(1)*((X-1)/100)*IN
    T(RND*5+1))
1030 WORTH(2)=INT(WORTH(2)+WORTH(2)*(RND/5))-3
1040 WORTH(3)=INT(WORTH(3)*(1+RND-.5)+X)
1050 WORTH(4)=INT(10000/(Z+2))
1060 DIFF=OLDPRICE(4)-WORTH(4)
1070 WORTH(4)=INT(OLDPRICE(4)-DIFF/2)
1080 WORTH(5)=INT(WORTH(5)+(WORTH(5)*5*(Y-4)/100))
1090 FOR N=1 TO 5
1100 DIFF=OLDPRICE(N)-WORTH(N)
1110 IF DIFF>0 THEN 1150
1120 IF DIFF<0 THEN 1170
1130 PRINT :NAME$(N); " WAS UNCHANGED. "
```

```
1140 GOTO 1180
1150 PRINT :NAME$(N);" WAS DOWN $";DIFF
1160 GOTO 1180
1170 PRINT :NAME$(N);" WAS UP $";-DIFF
1180 NEXT N
1190 PRINT : "HIT ANY KEY TO CONTINUE."
1200 CALL KEY(0,K,S)
1210 IF S=0 THEN 1200
1220 IF RND<.9 THEN 1280
1230 FOR DELAY=1 TO 500
1240 NEXT DELAY
1250 PRINT :: "NEWS FLASH!": "MOONBEAM OIL HAS JUST
      STRUCK A MAJOR NEW FIELD OF NATURAL GAS. THE BO
      ARD OF DIRECTORS"
1260 PRINT "HAS ANNOUNCED A 2 FOR 1{ 5 SPACES} STOCK
      SPLIT."
1270 OWNED(2)=OWNED(2)*2
1280 OLDBANK=BANK
1290 BANK=INT(1.05*BANK+3*OWNED(1)+1.2*OWNED(2)+90
      *OWNED(4)+Z*OWNED(6)/100)
1300 PRINT :: "YOU EARNED $";BANK-OLDBANK;"IN": "INT
      EREST AND DIVIDENDS."
1310 TOTAL=0
1320 FOR N=1 TO 6
1330 TOTAL=TOTAL+OWNED(N)*WORTH(N)
1340 NEXT N
1350 TOTAL=TOTAL+BANK
1360 PRINT :: "YOUR TOTAL WORTH IS NOW{ 5 SPACES}$";
      TOTAL::::
1370 ON YEAR GOSUB 1450,1570,1490,1530,1610,1630
1380 PRINT :: "HIT ANY KEY TO CONTINUE."
1390 CALL KEY(0,K,S)
1400 IF S=0 THEN 1390
1410 NEXT YEAR
1420 CALL CLEAR
1430 PRINT "NOT BAD! YOU STARTED WITH{ 3 SPACES}$50
      ,000 AND ENDED UP WITH":"$";TOTAL:::::
1440 END
1450 A=-3
1460 B=0
1470 PRINT "ECONOMISTS ARE PREDICTING A RECESSION
      FOR NEXT YEAR.":
1480 RETURN
1490 A=3
1500 B=0
1510 PRINT "ECONOMISTS ARE PREDICTING AN ECONOMIC
      BOOM NEXT YEAR.":
1520 RETURN
1530 A=0
```

Level 3 Games

```
1540 B=+3
1550 PRINT "ECONOMISTS ARE PREDICTING{3 SPACES}HIG
      HER INFLATION NEXT YEAR."::
1560 RETURN
1570 A=0
1580 B=-3
1590 PRINT "ECONOMISTS ARE PREDICTING{3 SPACES}LOW
      ER INFLATION NEXT YEAR."::
1600 RETURN
1610 A=0
1620 B=0
1630 RETURN
```


Number Sequences

Skill area: Mathematics and Logic

Level: 3

A number sequence is a series of numbers which follows a rule. For example, the sequence 3, 6, 9, 12, 15 is a number sequence, and the rule is: add three to the previous number. Of course, rules can be much more complicated; the series 1, 2, 5, 14, 41 is a sequence generated by the rule: multiply the previous number by 3, then subtract 1. Problems involving number sequences often appear on aptitude tests such as the college board exams.

The computer will present a series of five numbers. In each case there is a rule which produces the sequence. Your goal is to figure out the rule and type in the next number in the series. If you're correct, the computer will tell you, and if you're wrong, the computer will print the correct answer. You then have to enter the next number, and so on. When you have entered two correct answers in a row, the program assumes that you have figured out what the rule is and it goes on to the next problem. The program will also go on to the next problem if you cannot get two correct answers in a row after seeing the first 12 numbers.

After solving these 20 problems, try to think up new series and program them.

If you are stumped by one or more of the problems, the table following the program will show you what the rules are.

Number Sequences

```
100 REM  NUMBER SEQUENCES
```

```
110 REM
```

```
120 DIM N(20)
```

```
130 FOR J=1 TO 20
```

```
140 CALL CLEAR
```

```
150 PRINT TAB(8); "PROBLEM"; J:
```

```
160 C=0
```

```
170 K=1
```

```
180 ON J GOSUB 440,470,530,610,670,740,810,890,960
    ,1030,1110,1200,1280,1360,1400,1490,1560,1700,
    1850,1920
```

```
190 IF K>5 THEN 230
```

```
200 PRINT TAB(10); N(K)
```

```
210 K=K+1
```

Level 3 Games

```
220 GOTO 180
230 INPUT ANS
240 IF ANS=N(K)THEN 310
250 PRINT TAB(10);N(K)
260 C=0
270 CALL SOUND(300,-3,3)
280 K=K+1
290 IF K>12 THEN 420
300 GOTO 180
310 PRINT "CORRECT";
320 C=C+1
330 IF C=2 THEN 370
340 PRINT TAB(10);N(K)
350 K=K+1
360 GOTO 290
370 PRINT "HIT ANY KEY TO CONTINUE."
380 CALL KEY(0,Q,S)
390 IF S=0 THEN 380
400 NEXT J
410 END
420 PRINT "LET'S TRY ANOTHER ONE."
430 GOTO 370
440 REM ***PROBLEM 1***
450 N(K)=N(K-1)+2
460 RETURN
470 REM ***PROBLEM 2***
480 IF K=1 THEN 510
490 N(K)=2*(N(K-1))
500 RETURN
510 N(K)=1
520 RETURN
530 REM ***PROBLEM 3***
540 IF K=1 THEN 580
550 X=X+1
560 N(K)=N(K-1)+X
570 RETURN
580 N(K)=1
590 X=1
600 RETURN
610 REM ***PROBLEM 4***
620 IF K=1 THEN 650
630 N(K)=N(K-1)/2
640 RETURN
650 N(K)=2048
660 RETURN
670 REM ***PROBLEM 5***
680 IF K=1 THEN 710
690 N(K)=N(K-1)+N(K-2)
700 RETURN
```

```
710 N(K)=1
720 N(0)=0
730 RETURN
740 REM ***PROBLEM 6***
750 IF K=1 THEN 790
760 X=X+1
770 N(K)=2*X*X
780 RETURN
790 X=0
800 GOTO 760
810 REM ***PROBLEM 7***
820 IF K=1 THEN 860
830 N(K)=X*X
840 X=X-1
850 RETURN
860 X=12
870 GOTO 830
880 RETURN
890 REM ***PROBLEM 8***
900 IF K=1 THEN 940
910 N(K)=X*(X-1)
920 X=X+1
930 RETURN
940 X=2
950 GOTO 910
960 REM ***PROBLEM 9***
970 IF K=1 THEN 1010
980 X=X+1
990 N(K)=X^3
1000 RETURN
1010 X=0
1020 GOTO 980
1030 REM ***PROBLEM 10***
1040 IF K=1 THEN 1080
1050 N(K)=N(K-1)+X*X
1060 X=X+1
1070 RETURN
1080 X=0
1090 N(0)=1
1100 GOTO 1050
1110 REM ***PROBLEM 11***
1120 N(K)=31
1130 IF (K=4)+(K=6)+(K=9)+(K=11) THEN 1160
1140 IF K=2 THEN 1180
1150 RETURN
1160 N(K)=30
1170 RETURN
1180 N(K)=28
1190 RETURN
```

Level 3 Games

```
1200 REM ***PROBLEM 12***
1210 IF K=1 THEN 1250
1220 N(K)=N(K-1)+X
1230 X=X-1
1240 RETURN
1250 X=12
1260 N(0)=0
1270 GOTO 1220
1280 REM ***PROBLEM 13***
1290 IF K=1 THEN 1330
1300 X=X+1
1310 N(K)=N(K-1)*X
1320 RETURN
1330 N(K)=1
1340 X=1
1350 RETURN
1360 REM ***PROBLEM 14***
1370 N(0)=0
1380 N(K)=2*N(K-1)+1
1390 RETURN
1400 REM ***PROBLEM 15***
1410 IF K=1 THEN 1470
1420 X=INT(N(K-1)/100)
1430 Y=INT((N(K-1)-X*100)/10)
1440 Z=N(K-1)-100*X-10*Y
1450 N(K)=N(K-1)+X+Y+Z
1460 RETURN
1470 N(K)=17
1480 RETURN
1490 REM ***PROBLEM 16***
1500 IF K=1 THEN 1540
1510 N(K)=INT((1/X)*1000+.5)
1520 X=X+1
1530 RETURN
1540 X=1
1550 GOTO 1510
1560 REM ***PROBLEM 17***
1570 IF K<4 THEN 1650
1580 X=X+1
1590 V=2
1600 IF INT(X/V)=X/V THEN 1580
1610 V=V+1
1620 IF V<X THEN 1600
1630 N(K)=X
1640 RETURN
1650 N(1)=1
1660 N(2)=2
1670 N(3)=3
1680 X=4
```

```
1690 RETURN
1700 REM ***PROBLEM 18***
1710 N(1)=3
1720 N(2)=3
1730 N(3)=5
1740 N(4)=4
1750 N(5)=4
1760 N(6)=3
1770 N(7)=5
1780 N(8)=5
1790 N(9)=4
1800 N(10)=3
1810 N(11)=6
1820 N(12)=6
1830 N(13)=8
1840 RETURN
1850 REM ***PROBLEM 19***
1860 IF K=1 THEN 1900
1870 N(K)=INT(360/X+.5)
1880 X=X-1
1890 RETURN
1900 X=12
1910 GOTO 1870
1920 REM ***PROBLEM 20***
1930 IF K=1 THEN 2000
1940 Z1=INT((X^2)/100)
1950 Z2=INT((X^2-Z1*100)/10)
1960 Z3=X^2-Z1*100-Z2*10
1970 N(K)=Z1+Z2+Z3
1980 X=X+1
1990 RETURN
2000 X=1
2010 GOTO 1940
```

Rules for Solving the Number Sequence Problems

1. Add 2 to the previous number.
2. Multiply the previous number by 2.
3. Start with 1, add 1 to it, then add 2 to the result, then add 3 to the result, and so on.
4. Start with 2048, divide it by 2, divide that number by 2, divide that number by 2, and so on. The number 2048 was selected to start, because the result is 1 after 12 rounds.
5. Each number in the series is the sum of the two previous numbers.
6. Start with 2, then add 6, then add 10, then add 14, and so on. Alternately, this series can be thought of as 2 times consecutive squares (2 times 1, 2 times 4, 2 times 9, etc.).

Level 3 Games

7. 12 squared, 11 squared, 10 squared, etc.
8. 1 times 2, 2 times 3, 3 times 4, and so on.
9. 1 cubed, 2 cubed, 3 cubed, etc.
10. Add consecutive squares, i.e., add 1, then add 4 to that, then add 9 to that, and so on.
11. The number of days in each month.
12. Add 12, then add 11, then add 10, and so on.
13. Multiply the previous number by 2, multiply that by 3, multiply that by 4, and so on.
14. Multiply the previous number by 2, and then add 1.
15. Add the sum of the digits of the previous number to the previous number.
16. 1000 divided by 1, 1000 divided by 2, 1000 divided by 3, and so on.
17. Consecutive prime numbers.
18. The number of letters in one, two, three, and so on.
19. 360 divided by 12, 360 divided by 11, 360 divided by 10, and so on.
20. The sum of the digits in consecutive squares.

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